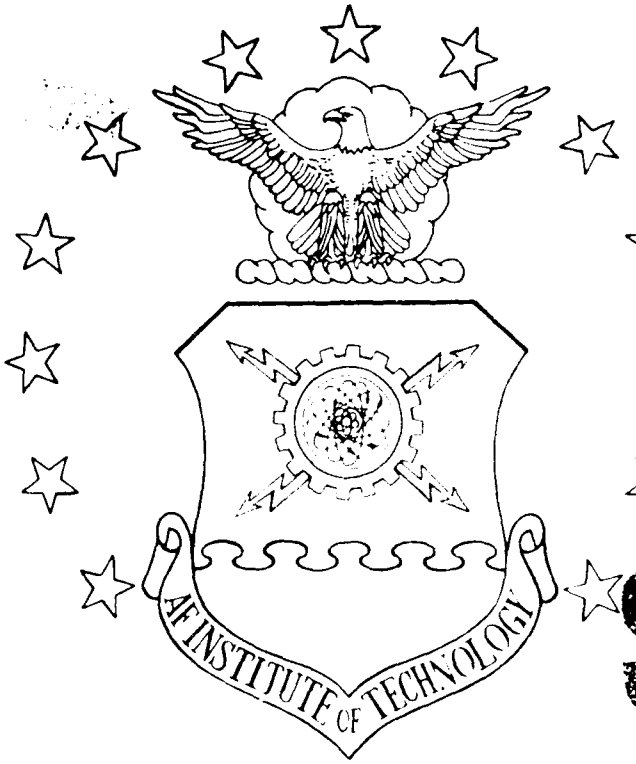

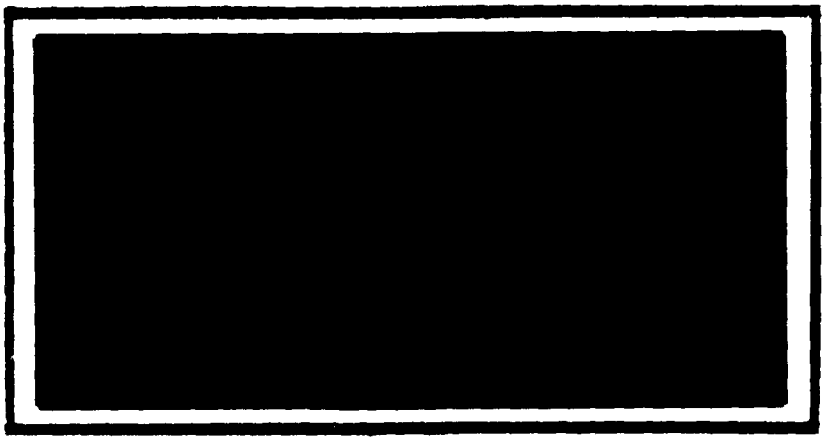

DEPARTMENT OF THE AIR FORCE

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AFIT/GLM/LSM/90S-5

DIMINISHED MANUFACTURING SOURCE: A COMMON SENSE APPROACH TO REQUIREMENTS DETERMINATION FOR LIFE-OF-TYPE PROCUREMENT

THESIS

James L. Brown

AFIT/GLM/LSM/90S-5

The opinions and conclusions in this paper are those of the author and are not intended to represent the official position of the DOD, USAF, or any other government agency.

AFIT/GLM/90S-5

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THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

James L. Brown, B.S.

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Preface

This study was undertaken in an attempt to develop some common sense rules for Life-of-Type procurement in cases where the last known source of supply withdraws from consideration and alternative suppliers cannot be found. This condition is referred to as Diminished Manufacturing Source (DMS). The current method for requirements determination on DMS buys has resulted in over procurement. The difficulty in accurate long-range forecasting (10 years or more) and the pending Defense Department budget reductions require a change of mindset when long term supply support is being considered. Traditional forecasting techniques based on historical demands and service demand projections have proven unreliable. Based on a thirteen-year record of actual demands and long-term procurement actions, this study will investigate the possibility of reducing levels of DMS procurement without serious detriment to long-term supply support.

In collecting and manipulating the data, I have been fortunate in having the help of the many professionals at the Defense Electronics Supply Center as well as those on the staff and faculty at the Air Force Institute of Technology. Special thanks to my wife Marilyn, who was a constant source of support. And to my children, Tommy and

Kimberly, who could not understand why daddy was away so much, I promise to show more attention to their needs in the upcoming year.

James L. Brown

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Abstract

This thesis studied the reason for over procurement in the case of long-term support for Diminished Manufacturing Source (DMS) items of supply at the Defense Electronics Supply Center located at Dayton Ohio.

A sample of 351 DMS items was selected for analysis. Fifteen percent of the items were deficient in stock primarily as a result of increased demands after the final LOT buy was made. Trend analysis reveals that 75% of DMS items experience declining demand rates both before and after the declaration of DMS.

To test the effects of reducing LOT quantities, all past sample LOT buys were reduced by 10%, 33% and 50% and checked against past demands. New stock outs were noted as a result of reductions in LOT buys.

Since the forecasting of future demands is inaccurate, this study recommends a common sense approach of 10% reductions to demand based LOT buys for DMS items of supply. Additionally, the increased use of a 40-quarter demand forecast is encouraged to better identify those items with increasing demands. For those items already procured which experience increasing demands after the DMS final buy, a new effort is recommended to find new sources of supply.

DIMINISHED MANUFACTURING SOURCE: A COMMON SENSE APPROACH TO REQUIREMENTS DETERMINATION FOR LIFE-OF-TYPE PROCUREMENT

I. Introduction

General Issue

> According to a study from the Brookings Institution, we can safely cut defense spending by half over the next ten years. Deep cuts seem to be a foregone conclusion. The politicians and pundits are already spending the anticipated "Peace Dividends", and the public is cheering them on (5:1).

In a climate of defense budget reductions, the Department of Defense (DOD) will be tasked to maintain an adequate security against threats with fewer resources. This could result in the cutting of major weapons programs, the closing of military bases both here and abroad (26), and the reduction of defense forces (18:3). Congressmen are reluctant to take actions which would affect defense jobs in their districts. There has been, and will continue to be, talk about closing bases or curtailing defense programs but any cuts made will be done so as not to displace federal workers who, after all, might ultimately vote out of office

any negligent elected official who would permit that sort of thing to happen. What really happens in the case of major defense programs is a stretching-out or delaying deployment. The result of that delay could be the fielding of an obsolete system. The basis of the obsolescence may be as a result of a change in the perceived threat over time. The delayed system, when deployed, no longer meets the threat it was originally designed to counter. Additionally, technological advances occurring during the development of a weapon system could render it obsolete before being deployed.

This argument is especially relevant in the case of electronic technology. Rapid advances in electronic technology can surpass the time span required to deploy a new weapon system. The problem of obsolete electronic technology also affects existing weapons system support when defense manufacturers discontinue production of the older technologies. Electronics manufacturers cannot be faulted for this phenomenon. With the increased economic threat from the Pacific Basin and the desire of American manufacturing to meet that challenge, leading edge producers of electronics components are not at all reluctant to drop from production an obsolete technology in an effort to remain competitive. This creates a problem for the DOD and the many long-lived weapons systems currently fielded. A

life span of 20-30 years for a major weapon system is not uncommon, especially when the system is being phased-out of U. S. military inventories and sold abroad to foreign military customers. As producers of currently demanded electronic components seek to remain competitive, the less frequently demanded items are dropped in favor of newer consumer electronic items which are in higher demand. In the competition for manufacturing capacity, infrequently demanded military-peculiar items supporting aging weapons systems lose out to the more profitable consumer electronics demands (25:47-110).

The problem the DOD has, then, is finding qualified electronics manufacturers to support the weapons systems still in use which utilize these older, and many times, obsolete technologies. One might think that, if supply and demand control what is produced in the market place, Defense Department demand for spare parts would be sufficient to ensure a continuing source of supply. The DOD budget is nearly $300 billion a year. Surely, that kind of money will attract many suppliers. The fact is, however, that consumer electronics has been on the rise for the past thirty years and the DOD has been edged out from a position of consuming over 90% of electronic technology to a position of less than 10% today (2:3). What's more, many DOD electronics applications have no commercial equivalents. As a minor

player in electronics technology consumption, the ability to control the underlying manufacturing base is greatly reduced. As former Defense Electronics Supply Center (DESC) commander Brigadier General Patterson stated in 1978,

> .....the surge of electronics on a functional and economic scale during the past 30 years has outstripped standard linear growth patterns and reached exponential proportions. And the entrepreneurial opportunities for firms, principally in the commercial market, has been extensive (24:30).

His assessment of the situation 12 years ago has no changed; only the magnitude has increased.

The DMS condition, hypothetically, could effect every item of supply during individual item life-cycles. Forecasting the occurrence of the DMS condition or predicting how long already aged systems will continue to be fielded is an exercise in futility. Any guess on system life expectancy beyond two years is just that- a guess. Forecasting <u>when</u> a DMS condition is likely to occur based on life-cycle analysis is useless when considering supply and demand as the real basis for what is offered for sale in the market place. The real problem remains: doing without the item of supply and the resulting negative effect upon weapon system support.

<u>Problem Statement</u>

The Defense Electronics Supply Center is the primary proponent and user of the Diminished Manufacturing Source

and Materials Shortage (DMSMS) program which addresses the problem of providing continued electronics parts support when the sole source of supply withdraws from bidding and declines to be considered as source of supply in future awards (19:8). The manufacturer informs DESC that production will be discontinued and that one final production run will be completed to supply whatever needs will exist through perpetuity. Usually, a 60-day time frame is allowed by the manufacturer for notification of the final production run. This gives DESC time to contact the users to find out what their needs will be and also to undertake several actions to facilitate continuing support. These actions involve finding alternate sources, finding a substitute part, reverse engineering/emulation, system redesign, system phase-out, level loading and Life-of-Type buying (7).

It will sometimes be possible to find alternate sources. Many times, however, the sole source manufacturer will own patents and trademarks or have proprietary rights which he will be unwilling to relinquish.

A substitute part can sometimes be found. Many times the application is so specialized that substitute parts are not available. Users are often times reluctant to accept substitute parts, especially when the part is going on a

submarine or an aircraft and loss of life could be the result of substitute part failure.

Reverse engineering involves reducing a part to its basic components to obtain drawings for invitations-for-bid (IFB). The new drawings can then be used to emulate the form, fit and function of the old part. Interested manufacturers can then attempt to qualify as a producer and supplier to the DOD.

The system could be redesigned to accommodate the emulated part or a substitute part. Users are very reluctant to accept redesign or phase-out caused by a supply deficiency in a support part.

Occasionally, a manufacturer can be persuaded to continue production, especially if a level load method is used to ensure future sales. A level load buy is an arrangement with the producer over a long period of time for the purchase of set quantities. A manufacturer is more likely to remain in business if the DOD can promise to buy a certain amount year in and year out for an extended period of time. The problem with this technique is that funding for stock fund procurement is done annually and the level load is a long-term commitment with funds not yet authorized. Additionally, demands may not materialize in the long term but the DOD is still obligated to purchase the

agreed upon amounts for the duration of the level load agreement.

The Life-of-Type (LOT) buy is the final solution for long-term support when all else fails. A LOT buy is the final procurement to provide support for systems until phase-out. The time frame for the LOT buy is usually arbitrarily set at 10 years. If the using service needs support for longer, a 15 or 20 year buy can be made. The inventory manager follows a set of procedures to forecast future demands for requirements determination in the final buy (8).

The process is begun by soliciting all users past and present for their future demands. Next, a review of past demands is conducted. In the absence of service projections, the inventory manager usually takes an average of the past eight quarters of demand as a basis for future demands.

A computer program used at DESC for desk-top computers has been recently developed to examine forty-quarters of past demand data. The program is an ENABLE spreadsheet that uses regression analysis to discover demand trends. Electronic consumables undergoing phase-out are not influenced by seasonality but may be identifiable by long-term declining demand trends as in the case of DMS. The

program examines the trend and projects a LOT buy quantity to support the item for ten years.

Figure 1 is an example of the ENABLE trend analysis output on a potential DMS item for which a LOT buy is contemplated. The rectangular area on the graph from 1988 through 1997 represents the LOT period under consideration for NSN 5960-00-105-6625. Based on past demands, an expected demand curve is fitted to the actual demand line and then projected through the LOT period. The darkened area below the expected demand curve represents expected demand levels through the LOT period. The entire rectangle, including the scored area above the darkened area, represents a straight-line buy quantity that might be determined by the inventory manager using the 1988 expected demand level (21). When the item experiences declining long-term demands, as this example illustrates, the LOT buy quantity may be larger than needed. Enable uses a forty-quarter demand history to calculate the trend. Once hardware problems are resolved at DESC and the program gains widespread use, inventory managers will be better able to correctly forecast LOT buys.

Table (1) is an example of a demand history from which the graph shown in Figure (1) could have been generated. The demand column in Table 1 indicates units demanded by quarter and fiscal year. For example, in the first quarter

in FY 1980, there were demands for eighteen each. The returns column is a units-of-stock listing by quarter for all assets returned from customers. For example, in the fourth quarter of FY 1982, 12 each were returned for credit from using activities having excess stock.

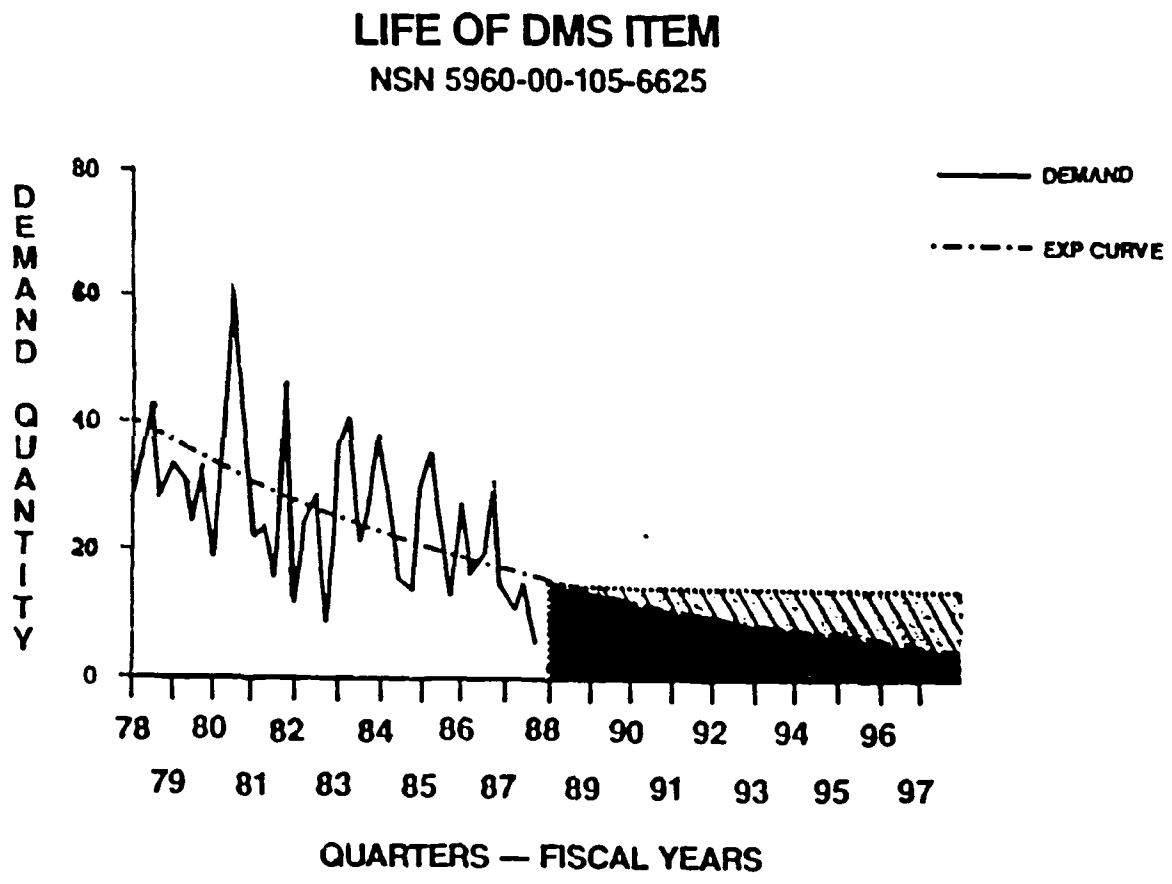

Fig. 1 DMS Trend Analysis Graph (28:5)

The forecast block of Table 1 provides the results of the analysis. The LOT Req Quantity line of the forecast block indicates the recommended LOT quantity to buy based on the trend analysis. When a declining demand trend is apparent, as in the case of Table 1, and there is no need for a LOT buy the ENABLE program will default to the smallest positive quarterly forecast of demand. In this example, a QFD of one is assigned.

The trend line quarter portion of the forecast block refers to the first quarter where demands are recorded or, the first quarter from which the trend analysis will begin. The individual running the program may choose the starting point from which to begin the trend analysis. If the user fails to select a starting point, ENABLE defaults to the first quarter with demands and begins the analysis from that point. In the Table 1 example, the default would have been to the first quarter in FY 1980 where eighteen demands were experienced. The analyst conducting the Table 1 interrogation of the demand history chose the first quarter in FY 1982 to begin the analysis.

TABLE 1

Forty-Quarter Demand History (28:7)

NSN 5935-00-065-9803 REQUEST DATE : 5/4/90

QTR NO	FYR	QTR	DEMAND	RETURNS
1	80	- 1	18	0
2	80	- 2	24	0
3	80	- 3	0	0
4	80	- 4	8	0
5	81	- 1	8	0
6	81	- 2	7	0
7	81	- 3	1	0
8	81	- 4	2	0
9	82	- 1	60	0
10	82	- 2	2	0
11	82	- 3	9	0
12	82	- 4	6	12
13	83	- 1	18	0
14	83	- 2	13	0
15	83	- 3	4	4
16	83	- 4	11	0
17	84	- 1	3	0
18	84	- 2	10	0
19	84	- 3	3	0
20	84	- 4	4	3
21	85	- 1	15	0
22	85	- 2	9	0
23	85	- 3	0	0
24	85	- 4	6	0
25	86	- 1	4	0
26	86	- 2	0	0
27	86	- 3	0	0
28	86	- 4	3	1
29	87	- 1	6	5
30	87	- 2	0	3
31	87	- 3	0	4
32	87	- 4	0	0
33	88	- 1	0	0
34	88	- 2	0	0
35	88	- 3	0	0
36	88	- 4	0	3
37	89	- 1	0	0
38	89	- 2	0	1
39	89	- 3	0	0
40	89	- 4	0	0
41	90	- 1	NA	NA
42	90	- 2	NA	NA
43	90	- 3	NA	NA
44	90	- 4	NA	NA

FORECAST

LOT REQ QUANTITY:	1
FORECAST QFD:	1
TREND LINE QTR #:	10

WARNING:
IF YOUR TREND LINE IS BASED ON LESS THAN 12 QUARTERS OF DATA,THE RESULTING FORECAST OF LIFE AND LOT REQUIREMENTS MAY NOT BE STATISTICALLY VALID.

As mentioned earlier, the manufacturer will usually give a 6-month notice before discontinuing production. Sometimes this notification is in the form of a trade journal advertisement or notice and fails to become known to the inventory manager in sufficient time to permit the necessary inquiries to the services to be made. The result is a decision to buy which is often inflated to protect against the possibility of non-support occurring before the end of the LOT period.

The problem of over procurement was discussed in a Philadelphia Inquirer article about excess consumable supplies in the DOD (27:3). The Defense Logistic Agency (DLA) was singled out for apparent excess supply problems at the Defense Electronics Supply Center in Dayton, Ohio. This article revealed that DESC managed 2,100 consumable supply items which had a 5-year supply on hand (based on current system Quarterly Forecast of Demands) valued at $14,000,000 (27:9).

Logically, past demands, user service forecast and knowledge of the Federal Stock Class (FSC) technology should be the basis in procurement for long-term support. In reality, however, past demands have not been a good indicator of future demands in DMS cases; service projections for future use have proven to be unreliable or non-existent; and inventory managers are not knowledgeable

enough about the current state of technology in the Federal Stock Classes they manage. A common sense method of LOT buy requirements determination would enable DESC to reduce stock fund investment in LOT buys without sacrificing long-term support.

Research Objectives

This research will examine the DESC master DMS listing (internal ESR11113 Report) and several other internal documents to DESC for Federal Stock Classes 5925, 5935 and 5950. The ESR11113 report will be the primary data source for the research. This report, which is updated monthly, is an historical record of all DMS items dating from 1976 to the present. A comparison of the historical procurement record will be made with results of several different LOT buy reduction scenarios. The procurement histories will be electronically extracted from the master procurement history file at DESC. A "what if" analysis will be conducted to discover what the impacts on supply effectiveness would have been on selected LOT year procurement reductions of 10%, 33% and 50%. For example, what would be the effect of having reduced all LOT buys by 10% for LOT year 88? By 33%? By 50%? Related research questions include: What percent of items would be out of stock under those three different scenarios? What would be the savings in unadjusted dollars? How many weapon systems would have been adversely affected?

What level of risk is acceptable? In the face of budgetary constraints and a perceived reduced threat to our national security, is the risk of reduced long-term weapons supportability worth taking?

Risk

When considering the idea of reducing LOT buy quantities for long-term support items, the question of risk should be addressed. It is difficult to assign a price or cost of non-support when a weapons system becomes inoperative due to lack of spare or replacement parts. If the deficiency resulted in a loss of battle or war, the cost would be very high. If, on the other hand, the deficiency resulted in the premature abandonment of a system which was already being phased out, the cost would be less prohibitive. One could easily defend the latter position by numerous examples of phase-outs while the former case might be supported by some rare examples where non-support had an adverse affect on national security. With the perceived reduced threat to our national security and the corresponding reduction in Defense Department spending, the risk of non-support might well be worth taking in consideration of the nature of DMS items of supply. That is, DMS items are in many cases, in the declining phase of the product life cycle and are already, or soon will be, obsolete. A complete discussion of the life cycle

phenomenon will be covered later in this paper. The important fact to note is that risks to supply support may not have been acceptable as recently as 1989. Today, in a climate of lowered political tension worldwide and Defense Department budget cuts, some level of increased risk may be acceptable or even welcomed in an effort to achieve desired goals. An acceptable level of risk to assume when considering reduced procurement for DMS LOT buys is a supply detriment level not to exceed 10%. That is to say, if a LOT buy reduction of any size resulted in a 10% or greater supply deficiency, the risk would be too great.

Hypothesis

The current method for requirements determination on Diminished Manufacturing Source items at the occurrence of Life-of-Type buy outs has resulted in over procurement. Based on the hypothetical scenarios of reducing past LOT year buys by 10%, 33% and 50%, long-term support for DMS items will not be adversely affected at the 10% reduction level; slightly affected at the 33% reduction level and adversely affected at the 50% reduction level. Inventory savings at the 10% reduction level are sufficient to warrant the risk of depleting stock before the end of the LOT period. Inventory savings at the 33% and 50% reduction level result in substantial savings to inventory investment but do not warrant the risk of depleting stock before the end of the LOT period.

Scope of Research

This study will not analyze all of the more than 3,000 LOT buys completed since 1976. Time will permit only an examination of a small sample. The danger of the small sample lies in the differing levels of technology and hence the differing likelihoods of comparable DMS conditions both between FSCs and also within a FSC. To counteract the problem of sample bias, three Federal Stock Classes were selected: FSC 5925, 5935 and 5950.

Because the basis of this research lies in stock quantities consumed or not consumed relative to the ten-year LOT period, adjustments for inflation will not be taken into account. Current unit prices will be used to evaluate overages and shortages to expected 31 December 1989 balances since DLA annually adjusts unit prices for inflation.

December 31, 1989 is the cut-off point for data. All conclusions are based on the database of record as of the cut-off date for the research. Subsequent events, item balances and policy changes are not considered.

Background

This literature review will begin by examining four past theses on Diminished Manufacturing Sources completed at the Air Force Institute of Technology. These theses were completed during the time when the problem of inaccurate

demand forecasting for Life-of-Type buys was first recognized (1978-1982). Next, several important journal articles relating to current issues in DMS will be discussed. Among these issues which relate to DMS are private-sector occurrences of DMS, Total Quality Management (TQM), the Qualified Manufacturers List (QML), Computer Aided Logistics (CALS), and the Army's use of emulation. Lastly, a review of forecasting techniques will discuss possible forecasting methods and their implications for DMS LOT buy quantity determinations.

Integrated circuits (IC) represent the largest single stock class with DMS items. Therefore, important and recent developments in ICs and the impact on DMS will be discussed. Integrated circuits were not chosen to be part of the sample selected for analysis because of the volatility of demands and the unique behavior demonstrated by many IC DMS items. Leap-frogging silicon chip technology is advancing faster than the DOD can absorb into existing programs and systems (13:54). It is not uncommon for an IC to experience a DMS condition while also having increasing demands. For the purposes of this study, several other more stable stock classes were selected for analysis.

Brooks 1981. In a thesis by Captain Michael E. Brooks in 1981, "An Investigation of Time Series Growth Curves as an Predictor of Diminishing Manufacturing Sources of

Electronic Components", a relationship was indicated between the growth and decline of demand levels over time in terms of sales, and the occurrence of DMS (2). He began the discussion with his assessment of the evolution in technology for electronic components (2:18). He traced the evolution of technology from vacuum tubes and transistors through an explanation of semi-conductors and integrated circuits. His point is well taken that, in a very short period of time, technology has advanced at an alarming rate. That rate of advancement is indirectly the cause for DMS. As manufacturers produce the "new" technology and drop the "old" technology, sources of supply disappear. Those aged defense systems, which rely on older technologies are then without support for the balance of time they remain fielded or deployed. In an article written by General Patterson about the life-cycle of technology and reported on by Brooks in his thesis, a demonstration of where and when the DOD impacts the life-cycle curve was shown (2:12). Figure 2 graphically depicts the life cycle of technology as it relates to government demands (2:12). It should be noted that government demands peak in the declining phase of the life-cycle.

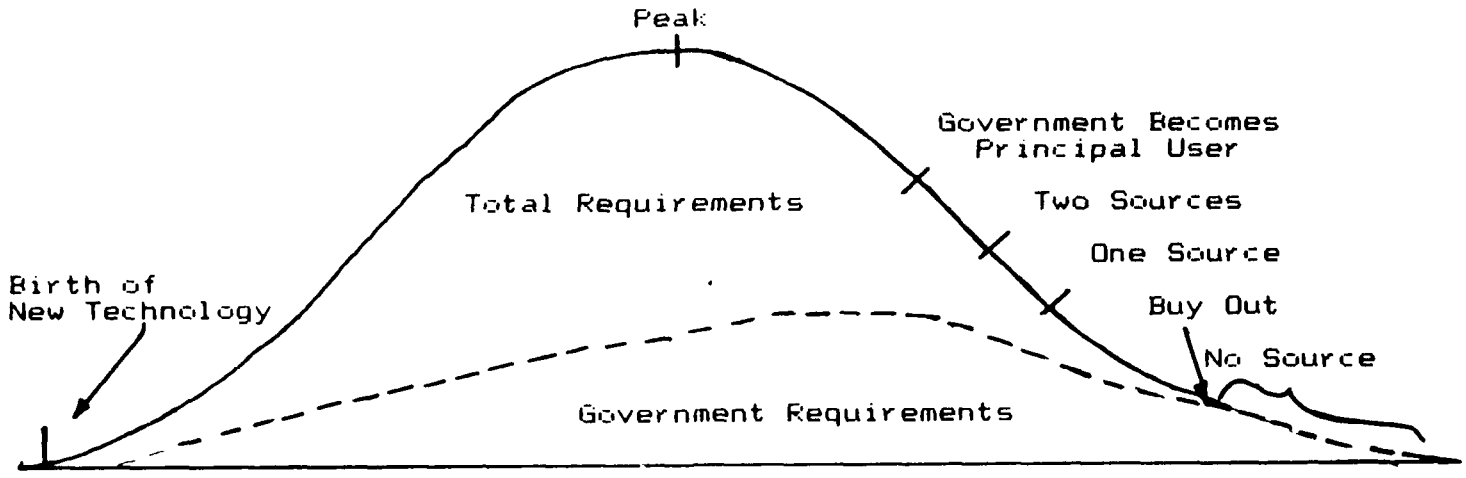

Fig. 1 Lif Cycle of Technology (2:12)

Brooks hypothesized that annual sales were indicative of the product life cycle curve which could be re-expressed as an S-curve. A standard growth curve model could be fitted to observed data using the least squares regression method with a 5% or less coefficient of variation (2:34). He found, not surprisingly, that as demands fall for an item of supply during the maturation and decline phase of the product life cycle curve, the DMS condition occurs more frequently. Figure 3 illustrates the product life cycle curve which was developed from an internal study by DESC and reported on by Brooks in his thesis (2:28).

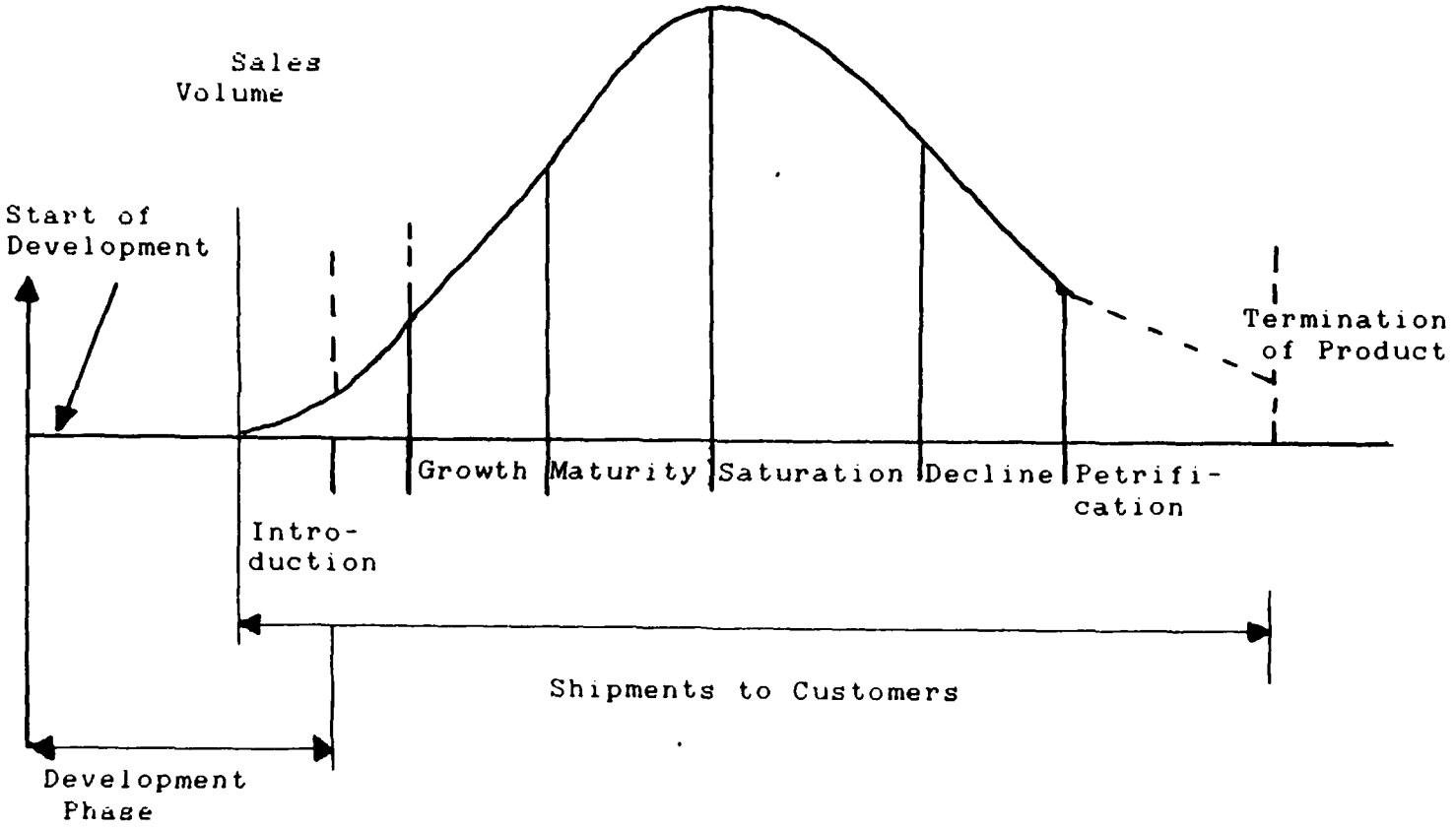

Fig. 3 Product Life Cycle (2:28)

As technological advances in electronic circuitry replace obsolete items and users change over, whenever possible, demands on the older technology decrease. At the point in the product life cycle where continuing manufacture cannot be economically justified, a DMS condition begins. Indicated in Figure 3 is the progression of the product life cycle as it follows a general pattern of introduction, product growth, maturity, saturation and decline (2:28). Eventually, sales drop to a level at which manufacture is no longer profitable and the item is dropped from production.

In general, the Brooks model is valid for stating when DMS is likely to occur on the product life cycle curve and is useful with some qualifications. Brooks uses the product life-cycle to discuss the idea of technological forecasting. He refers to a book by Joseph Martino for a definition of technological forecasts (20). A technological forecast is a prediction of the future characteristics of useful machines, procedures or techniques (2:27). For example, if one knows where on the product life-cycle curve the technology of a particular stock class is located, a forecast of future sales might be possible. Government policy decisions to extend the lives of some older weapon systems beyond their originally forecasted life span, have caused a distortion of the original LOT period projection. The result of this may be an error in the prediction of when a DMS situation might

occur. When the decision is made to extend the life of a weapon system, demands might increase as activities decide to, for example, bring maintenance up-to-date. Some commands might delay non-routine maintenance on systems scheduled for phase-out. When the decision is made to extend the life of the system, postponed maintenance is begun. The result is increased demands for spare and repair parts. The tendency would be for declining demands to level off and delay the occurrence of DMS. Sales of military items to foreign governments often involve extended periods of logistic support. A major item may no longer be used by U. S. forces, but follow-on logistic support is a guarantee to the foreign government as an inducement to purchase, for example, a major weapon system. These and other factors tend to skew the product life cycle curve to the right and extend the saturation and decline phases. The result is more difficulty in predicting exactly when DMS will happen.

From a pragmatic point of view, does it really matter that we know when a DMS situation will arise? If we know that in general, demands on an item are in a tailspin, are we really likely to go out and seek new sources? From the master DMS list we see that more than three-fourths of all DMS items are permitted to die a quiet death (no LOT buy initiated, no new sources solicited). The DESC management philosophy of management by exception does not justify

action where no action is needed. If demands are going along normally, as in the case of the other twenty-five percent of DMS items (which ultimately receive LOT buys), why or how could the inventory manager be alerted to a potential DMS situation? The question which logically follows from Brooks' work is that if we are made aware of the DMS situation in advance, could we take steps to delay or prevent it? In the case of declining demands and no projection of future demands, who cares? In the case of DMS on an active item of supply, who could have known? While the life cycle of technology explains what happens in a DMS situation, it is not useful as a preventative measure.

Corbett, Schultz and McCarthy 1978. In a thesis by Major James Corbett, Captain Delray Schultz and Captain Donald McCarthy, "The Relationship Between Dollar Volume of Sales and Diminishing Manufacturing Sources for Selected Electronic Components: A Comparative Analysis," an attempt was made to use product life cycle as a predictor of DMS (4).

They hypothesized that the function defining dollar volume of sales for receiving tubes and its corresponding relationship to receiving tube DMS condition would approximate the same function for semiconductors and integrated circuits (4:11). They found that the prediction of DMS across FSC lines was not possible due to differing

levels of technology and product life cycles (4:30). While the receiving tube was a dying technology, the semiconductor technology and applications was still experiencing growth (4:30).

Fisher and Sheehan 1982. In a thesis by Christine Fisher and Walter Sheehan in 1982, "The Life-of-Type Inventory Decision for Diminishing Manufacturing Sources Items: A Sensitivity Study", demand levels and costs were examined for their impact on the Economic LOT Quantity (ELQ) (11). Their model summed procurement costs, holding costs and shortage costs to arrive at a total cost of the Life-of-Type buy or ELQ (11:70). In the formula below, the first term on the right-hand side identifies procurement costs. The second term refers to holding costs. The final term on the right-hand side deals with shortage costs.

$$TC(Q) = CQ + H \sum_{d=0}^{Q} (Q-d)\, P(d) + B \sum_{d=Q}^{\infty} (d-Q)\, P(d) \qquad (1)$$

Where: TC = Total Costs

Q = Quantity

C = Unit Cost

d = random variable for demand

P = Probability

H = Cost to Hold

B = Shortage or penalty cost (11:70)

The penalty cost is calculated as the unit price times two to the fourth power or sixteen times the value of the unit price. For example, a DMS item with a unit price of $5 would have a shortage cost of $80. In other words, according to Fisher and Sheehan, the item manager has been willing to buy on average, $80 extra in safety stocks to buffer against the possibility of issuing all the stock before the end of the ten-year LOT period (11:73).

Fisher and Sheehan demonstrated the penalty cost or shortage cost by evaluating DMS items in terms of historical demand distributions. Items with annual demands of 1-25 units were considered to have a Poisson distribution for future demands. Items with 26-75 annual demands were expected to have a normal distribution with respect to future demands. Using their penalty cost formula $B = C(2^m)$, it was determined that in both distributions, a penalty cost where m=4 was predominant. It was, therefore, generalized that based on the DESC policy of ten-year LOT Buys, a penalty cost of 16 times unit price was the norm (11:73).

Their statistical analysis revealed that only 10% of DMS items will reach a zero stock level in the year for which support was projected to end. Those items which fell short or ran out before the end of the LOT period totaled 25%. The balance, 65% of all DMS LOT buys, were over

bought. They found that 47% of all DMS buys provided support in a range of -7 to +8 years to the end of the LOT period intended. This might best be visualized on a time line with zero representing the desired end of LOT period. Figure 4 is a time line with the support levels indicated.

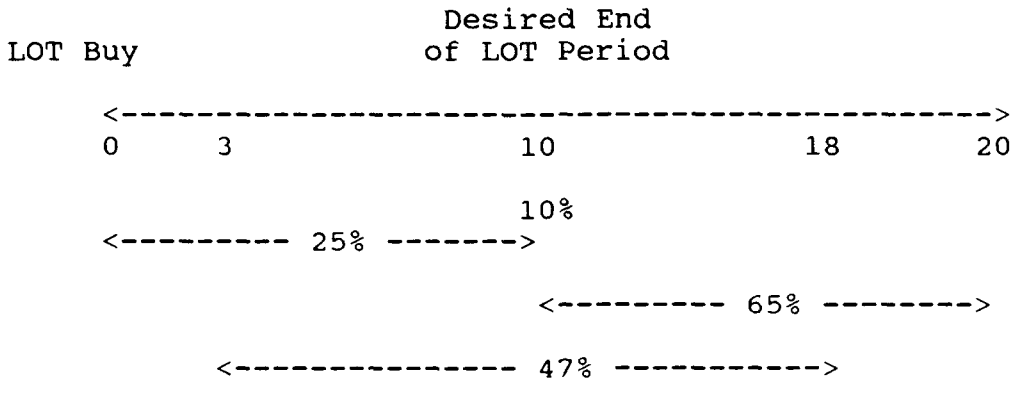

Fig. 4 Stock-out Time Line Years

This means that the supply either fell short by one to seven years of the required support period or that supply was in excess from one to eight years beyond the required support period. The conclusion is that 53% of DMS items fell outside of the range resulting in one of two possible situations: 1) All stock was depleted in the first three years of the LOT period, or 2) Some assets remain after the end of the LOT period. Fisher and Sheehan found that larger numbers of items were over bought than were under-bought (11:88-89).

Fisher and Sheehan's study also examined the idea of three dimensional graphs to depict regions for trade-offs in holding costs and penalty costs. This type of analysis demonstrated in Figure 5, was earlier demonstrated by Gardner and Dannenbring in their optimal policy surface diagram for stochastic demand (15:709). In this diagram, the (X) axis of investment dollars is plotted against the workload on the (Y) axis and the percent of requisitions short on the (Z) axis (15:709). Fisher and Sheehan used the Garner/Dannenbring idea in Figure 5 when they proposed using "optimal policy surfaces" to show the possibilities for inventory decisions to be conceived as policy trade-offs (on a three-dimensional response surface) (11:94). This point was important to Fisher and Sheehan to the extent that they assumed that costs (holding and/or penalty costs) some how affected the ultimate LOT buy quantity. While the trade-off between the two costs is valid and reasonable, it simply does not affect final LOT buy quantities under current policy and procedures in DMS procurement for long-term support (8).

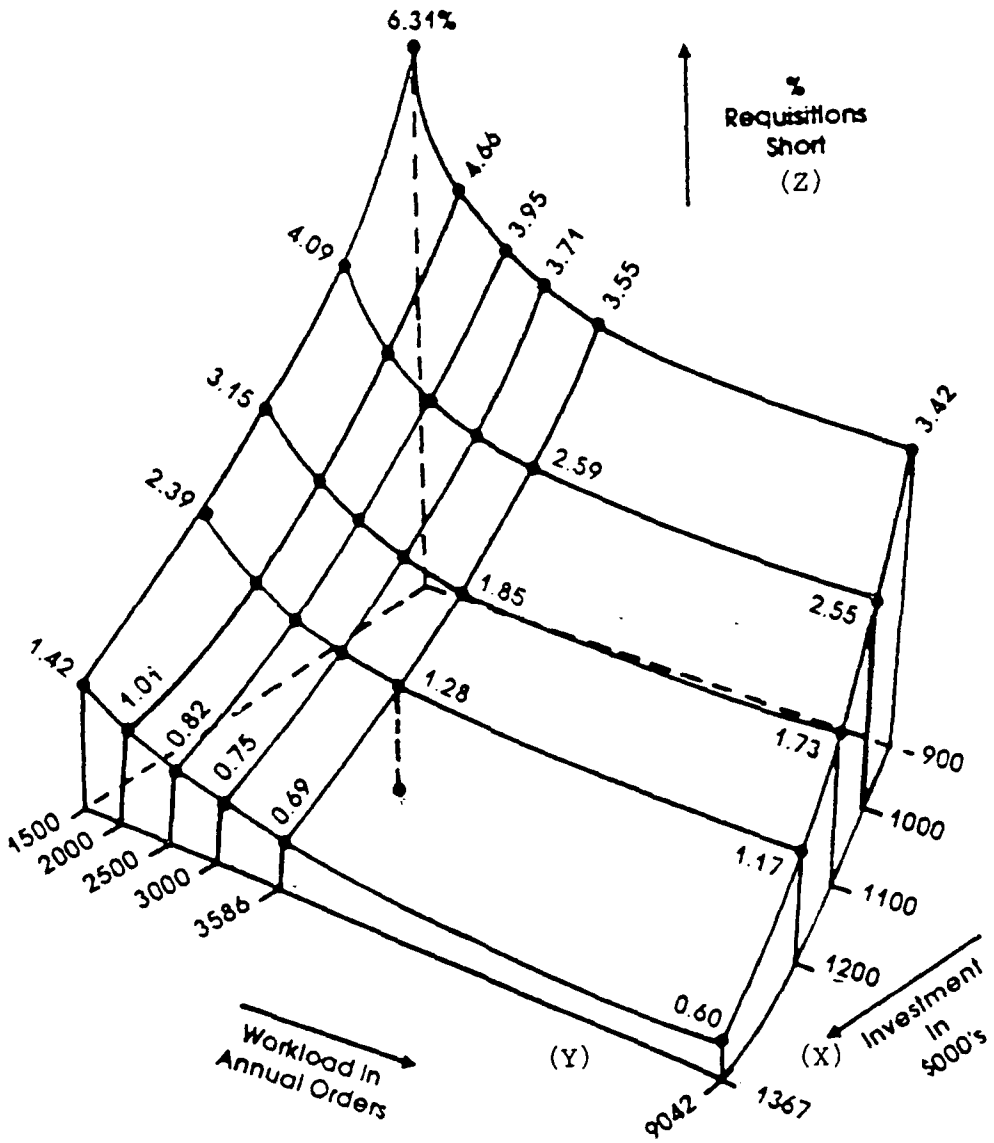

Fig. 5 Policy Surface Diagram (15:709)

In the final analysis, DESC is charged in providing long-term consumable electronic supply support. While "penalty cost", holding cost, cost of capital and historical demand analysis are weighed considerations in that process, predicting future demands accurately for LOT buys has been less than successful. Fisher and Sheehan's model considers costs as the primary factor affecting the final Estimated Lot Quantity (ELQ). Once the decision is made to provide long-term support, at whatever level, past demands are the underlying factor used to determine the LOT quantity.

In the absence of a reliable forecasting method for DMS LOT buys, and now, with a large historical record of past procurement as a benchmark, the Fisher and Sheehan argument for economic considerations in long-term support decisions, regardless of how it was conceived or derived, is justifiable more than ever before. Since their "costs' directly relied on demand forecasts, which were unreliable for both the Poisson and normal distribution models, the argument against a penalty cost is not warranted. Of the two models, the normal distribution model was the most unreliable. This is important when considering that most LOT buys would be based on demand patterns which Fisher and Sheehan identify to the normal distribution.

In summary, Fisher and Sheehan did an excellent job of investigating the problem of DMS but their conclusion that

demands and costs are functions of what they define as Economic LOT Quantity is only partially correct. Apart from the fact that accurate cost estimates cannot be reliably obtained for holding and penalty costs, Fisher and Sheehan over emphasized the importance of costs. The argument that costs have a very small role in the final LOT buy quantity is supported by the nature of past demands and the ability of using activities to submit funded requisitions for their requirements. For example, if a using activity submits requisitions for 10 each in one year at a total cost of $10,000,000 with a storage cost (holding cost) of $1,000 per week, the source of supply is not likely to challenge the user over cost or attempt to change the LOT buy quantity based on costs alone. The user will temper his requirement based on costs but the source of supply will not necessarily consider costs when determining requirements. For this reason costs have an insignificant role in determining LOT buy quantities at the point of supply. The LOT buy is a function of demands to the extent that past demands are (incorrectly in my estimation) used as a basis for predicting future demands. Their conclusion that the LOT quantity has not been determined accurately in the past is correct. Given the forecasting tools currently available, it is not clear if a better method can be derived.

The importance of their contribution to the understanding of the DMS problem lies in their very early appreciation of the LOT buy procedures which, all to often, result in over procurement. Even at this relatively early stage of the DMS program (1981), they realized the importance of procurement excesses. While their attempts to arrive at a better forecasting method for LOT buys fell short, by their own admission, the forecasting inadequacy is considered to be of secondary importance to their overall contribution.

Many other efforts to improve DMS forecasting have failed since Fisher and Sheehan. The problem lies in trying to predict weapon system life spans in a world climate of foreign military sales, budgeting constraints, political maneuvering with respect to the defense budget and leap-frogging technology, all of which impact the reliability of forecast for long-term supply support.

Capotosti and Curran 1981. In a thesis by Capotosti and Curran in 1981, "A Study on the Effects of Diminished Manufacturing Sources on the Supportability of the AN/ASQ-38 Radar System", an in-depth investigation was conducted of a particular DMS occurrence (3). Their methodology included interviews with contractors and subcontractors involved with supporting the AN/ASQ-38 radar system. This system had unexpectedly experienced a DMS situation. Their candid

interviews with manufacturers provided some interesting insights. Suppliers to DOD do not think we are doing enough to embrace standardization. In far too many cases, standard items would have sufficed where newly designed parts were used. Manufacturers were also concerned that DOD was too slow to adopt new technology. They believe that proven replacing-technologies should be used in DOD items whenever possible. This, they believe, would eliminate the problem of no sources for DOD items of supply (3:26). On the other side of the coin, DOD was accused of adopting some technologies before being completely tested and proven. When this happens and a failure is the result, the manufacturer is often accused of providing inferior parts (3:25). Another reason for manufacturer withdrawal as a source is strict procurement rules and all the accompanying red tape (3:26). In cases of marginal profitability, this factor alone may be enough to discourage the manufacturer from further production.

A somewhat lesser factor contributing to the DMS problem is strict design specifications. The DOD has been reluctant to authorize design changes (as have been the using services) especially for aircraft and submarines. This reluctance is partially attributed to safety concerns. It takes only one occurrence of downed aircraft and loss of life to place all substituted parts under suspicion. The

Capotosti and Curran thesis was completed in 1981. Since that time, efforts have been made to lessen design restrictions, especially on non-critical parts and supplies (22).

The Defense Electronics Supply Center has recently been studying the possibility of emulation as a means of duplicating the form, fit and function of some DMS items. Integrated circuits have been selected for the emulation program since it represents the single largest federal stock class having the DMS problem (23).

Current Issues. The previous discussion was concerned primarily in two areas: 1) how to predict when DMS would be likely to occur and, 2) an identification of the causes of DMS. Much of this research was done nearly a decade ago. A review of the body of DMS literature would not be complete without a review of current issues, especially since so much of what has been previously written is dated. Recent interest in DMS has been in two areas: 1) prevention and, 2) alternative sources of supply. Implied in the recent literature is the recognition that present management practices probably will not prevent DMS and that viable alternatives are possible due to advances in communication and data management technologies. While the basic premise of this research is to immediately have some positive effect by reducing LOT buy quantities and thereby reducing wasteful

inventory investment, other subtle and long-term management practices should be recognized. With that in mind, the following discussion includes some new ideas that, while individually may have very little impact on DMS, collectively could represent the long-term solution to the DMS problem.

Diminished Manufacturing Source was a military-peculiar condition during the time when the teams of Fisher-Sheehan and others were doing their research. Since then, DMS has spilled over into the private sector as many large corporations find themselves as owners of obsolete aircraft or other types of capital equipment (6:2F). Many air cargo fleets using older propeller driven aircraft have begun to experience difficulties in finding spare parts (6:2F). The problem is one of magnitudes. An individual may be unable to find a part for his old airplane. He could just buy a newer airplane for which parts were readily available (one airplane). A military service cannot just discard a fleet of military aircraft and go buy another fleet of newer military aircraft whenever a spare part becomes unavailable. While the problem of Diminished Manufacturing Source may have been experienced in the private sector in isolated cases, the real impact involving large numbers of like aircraft fell upon the military services. Producers of original aircraft are reluctant to retool for production

when future demands are unknown (6:2F). If, on a rare occasion, the decision to resume manufacture is made, added costs (tooling, set-up, etc.) and extended lead times are the result (6:2F). Some air cargo companies are considering in-house manufacture to assure spare parts availability (6:2F).

The Army has embarked on an emulation program to extend the life of their OH-6A helicopter (21:24). Emulation is the process of re-manufacturing of spare and replacement parts which emulate the form, fit and function of the original equipment (22). The emulated part may be made from different materials or have a different physical appearance from the original item (22). The important idea is that the emulated part performs as well as or better than the original equipment (22).

The Defense Electronics Supply Center is also developing an emulation program for integrated circuits (FSC 5962) (22). From Table 5, the master DMS list, sizable representation of ICs is observed. Many of these ICs require special long-term storage in a controlled atmosphere (19). A recent upgrade of Read-Only-Memory (ROM) and Programmable-Read-Only-Memory (PROM) computer chips has greatly reduced manufacturing and testing costs (13:54). The Field-Programmable-Gate-Array (FPGA) will greatly reduce re-programming time and expense (13:54). Since the usage of

the FPGAs is expected to increase, fewer new DMS cases in integrated circuits should be expected in the future. Field-Programmable-Gate-Arrays are in a class of ICs referred to as Application Specific Integrated Circuits (ASIC) (13:54). By the year 1993, ASICs will be more than 70% utilized for all military IC applications (13:54).

Other developments currently under way that may have an impact on future DMS cases include Total Quality Management (TQM), Computer Aided Logistics Systems (CALS) and the Qualified Manufacturers List (QML). Total Quality Management could produce better working relations with manufacturers which could result in continuation of support in some DMS cases which might not have otherwise occurred (9:58). Computer Aided Logistics Systems will reduce the paper mountain contractors endure to do business with the DOD (14:62). The problem with this idea is in the commonality of the data base which all qualified suppliers share. Contractors are reluctant to provide cost information which would be accessible to their competitors who would be monitoring the system data base (14:62). CALS may reduce the threat of DMS in marginal cases (i.e., when the cost of submitting the bid is the determining factor in the bid/no bid decision) (14:62). The Qualified Manufacturers List (QML) is an outgrowth of the old Qualified Producers List (QPL) (27:49). The improvement

lies in the rules changes which have served to reduce production cost for computer chip manufacturers by allowing more flexibility to make rapid improvement in the manufacture of military devices (27:49). The savings realized is in lower testing costs (12:49). TQM comes into play with the QML as the driving factor to create an atmosphere of mutual trust and goal attainment (27:49).

Recent trends towards the use of commercial grade hardware is seen as a positive development impacting future DMS cases (12:68). In general, items of supply which are used in both the private and public sectors, enjoy extended product life cycles as heightened demand levels become sufficient to assure a continuing source of supply (12:68).

Forecasting Problems. Accurate forecasts for long-term supply support (10 years or more) have not been possible because all variables are not or cannot be identified or determined. A simple methodology tree diagram illustrated in Figure 6, compares the alternative methods used in forecasting (1:71). Subjective methods are those in which the processes used to analyze the data have not been well specified, while objective methods are those that are well specified processes to analyze the data (1:67). Subjective methods are judgmental but can be transformed into an objective procedure by means of bootstrapping. This involves the idea that it is possible to develop a model of

how a person makes a judgmental forecast. The model may then be able to provide better forecasts than the person could (1:71).

Moving up the objective side of the tree in Figure 6, a comparison between naive and causal methods is best described on a time continuum with the line of demarcation between naive and causal open to individual interpretation. A strictly naive method necessarily leads to extrapolation forecasts. At the other end of the continuum is the causal method which implies that some causal relationship between events and outcomes can be identified (1:68). If causality can be reasonably established, a linear method of classification method might be used to forecast a future event (1:69-70). An exact causal relationship between past demands and future demands is not evident in the case of DMS items which makes it difficult to use objective methods to arrive at a reliable forecast.

The linear method shown in Figure 6 is based upon the usual way we think about causality: If (x) rises, (y) will increase by some amount (1:70). The classification method attempts to find behavioral units that respond in the same way to the casual variables and to group these units. To make a prediction, then, one merely needs to determine the category into which the unit falls (1:70). Linear

methodology leads to some econometric solution while classification results in segmentation.

Ideally, in government and business, forecasting decisions should be the result of objective analysis. Such is possible when all variables can be identified and quantified. In the case of long-term forecasting for DMS Life-of-Type procurement, complete knowledge cannot be known. Forecasts produced under these conditions of uncertainty are based upon incomplete knowledge. Procurement actions based on these faulty forecasts have resulted in over procurement.

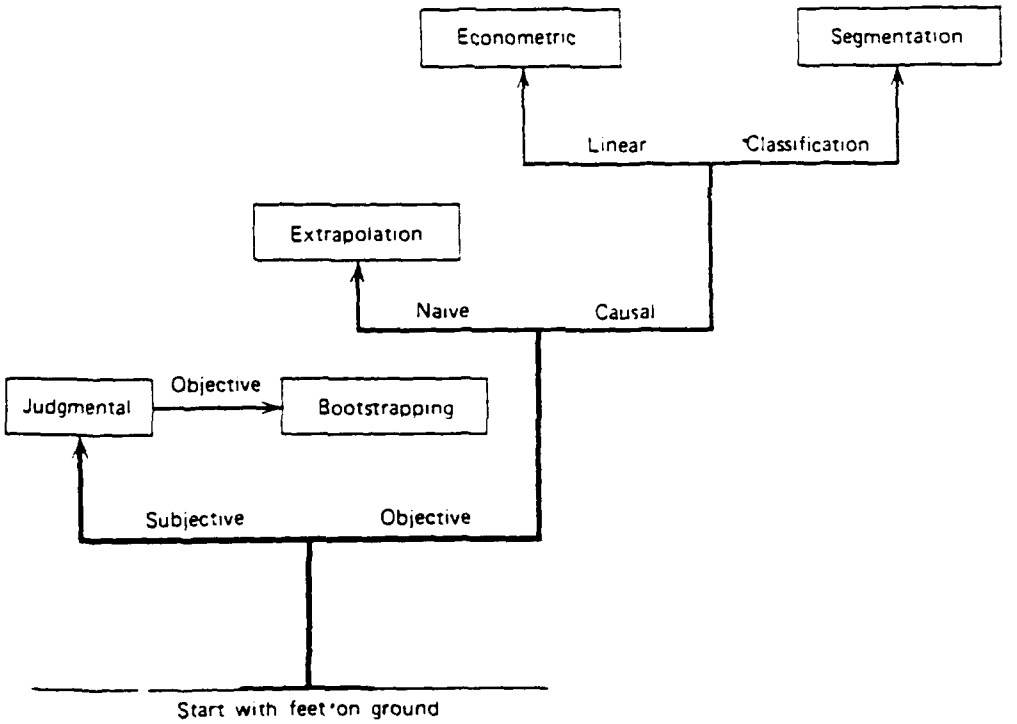

Fig. 6 Forecasting Methodology Tree (1:70)

In reference to accuracy of forecasting methods, Makridakis states:

> ...how (does one) measure the suitability of a particular forecasting method for a given data set? In most forecasting situations, accuracy is treated as the overriding criterion for selecting a forecasting method. In many instances, the word "accuracy" refers to "goodness-of-fit" which in turn refers to how well the forecasting model is able to reproduce the data that are already known. In explanatory (causal) modeling, goodness-of-fit measures predominate. In time-series modeling, it is possible to use a subset of the known data to forecast the rest of the known data, enabling one to study the accuracy of the <u>forecast</u> more directly. To the consumer of the forecast, it is the accuracy of the <u>future</u> forecast that is most important. To the modeler, it is the goodness-of-fit of the model to the known facts (quantitative and qualitative) that must be addressed (20:43-44).

This disparity between what can be quantitatively modeled and what is realistically modeled for forecast accuracy has resulted in a stand-off between modelers and users of forecasts of demands in DMS situations.

In the absence of reliable and quantitative modeling techniques and with a substantial history of DMS procurement results, subjective techniques should be examined in future forecasts for DMS Life-of-Type procurement decisions.

<u>Background Summary</u>. The body of literature concerning the Diminished Manufacturing Source condition prior to Fisher and Sheehan evolved around predicting the initial occurrence of DMS (Product life cycle approach of Brooks and Corbett et al) and exploring the base causes of the problem

(Capotosti and Curran). Fisher and Sheehan attempted to forecast future demands given that a DMS situation was imminent. Additionally, they examined costs in an unsuccessful and incorrect attempt to associate all costs with a correct Estimated LOT Quantity (ELQ) for the Last-of-Type buy. Their research was not valueless, however, since it statistically evaluated the extent of procurement excesses existing at the time and which have since gone unchecked. They concluded that over procurement was a problem as early as 1982. Their conclusion today would be well received in our current climate of budget constraints and with the American public's perception of a decreased threat of war to our national security and the impact that perception has on pressure for defense cuts. The timing of their work coincided with the beginning of the build-up in national defense during the Reagan years (1980-88) and unfortunately was ignored or forgotten.

Realizing that preventing DMS is preferable to having to deal with LOT procurements and the accompanying uncertainties, the current trend is to promote continuing sources of supply. The Total Quality Management (TQM) concept, Computer Aided Logistics Systems (CALS) and the Qualified Manufacturers List (QML) are attempts to enhance communications and improve the working relationship between government and industry.

Forecasting future demands for DMS Life-of-Type buy quantities has proven to be faulty. Intuitively, one might consider the most recent past demands as a reliable indicator of future demands. In reality, such is not the case because many DMS candidates experience declining demands for an extended period of time prior to becoming a DMS item. The declining trend continues for those items after DMS is declared. Unfortunately, current management practices place heavier emphasis on most recent demands than is placed on the long term demand trend when forecasting for DMS LOT buys. The result has been over procurement in three out of four DMS LOT buys. We now have sufficient historical data on past DMS LOT procurement to make some common sense decisions about future DMS inventory investment.

II. Methodology

Criteria Development

A pilot study was conducted to determine the extent of over procurement in consumable electronics supply parts. Life-of-Type (LOT) year 89 was selected since conceivably, all assets purchased in 1979 for the LOT period 1980-89 would have or should have been used by 31 December 1989. Fifty-five supply items were bought for long-term support in 1979. Table 2 indicates total dollar investment for the fifty-five items at $4,580,445. By the end of the LOT period, on hand assets totaled $4,337,139, indicating a decline of 5.4% from the initial LOT outlay.

Three items depleted all assets before the end of the LOT period. Of these three items, only one item directly supported a weapons system and was correctly purchased based on the then procurement policies. The LOT buy for more than $92,300 provided support for more than six years. Twenty-three items had more stock on-hand at the end of the LOT period than was purchased in the initial LOT buys. Using activities not only failed to utilize assets held in long-term storage for them, but also turned in as excess stock those inventories already on-hand prior to the beginning of the LOT period.

TABLE 2

DMS LOT Year 89

	NSN	1979 LOT Buy $	1989 Bal
1.	5930007868436	$ 39729	$ 37450
2.	5935005572514	63249	25913
3.	5945002595612	24950	19553
4.	5960000815928	2507	232716
5.	5960001169948	21510	28197
6.	5962010233276	9075	37280
54.	5962004548425	5980	42091
55.	6625008347673	92250	46895
Total		$ 4580445	$ 4337139

Ten items in federal stock class (FSC) 5960 were bought for a 5-year LOT period instead of the normal 10-year period. One might assume that a 5-year LOT period would be easier to forecast and more accurate since using activities would have to guess their requirements over a shorter period of time. Such was not the case since all ten items had stock on-hand more than a decade later. The mean dollar value for stock on-hand for these ten items was $272,909.

When compared to the mean value for stock on-hand for the whole group of fifty-five items ($78,860), it would appear that the ten 5-year buys skewed the data. By omitting the ten 5-year buys from the data and using the remaining 45 items, the mean dollar balance of stock on-hand at the end of the LOT period was $36,102.

A recent internal study conducted by the Operations Research Office (RO) at the Defense Electronics Supply Center (DESC), Dayton, concluded that three out of four DMS items experience decreasing demands after becoming DMS (10:5). Percentages of decreasing demands on items exhibited in Table 3 range from 16% in Item Name Code (INC) 61638 to 97% in INC 00208. It may be noted that all except two INCs (184 and 61638) had items with zero life or zero demand experience after DMS and, more importantly, a small minority of items had life of over 40 quarters (10:5).

Column one of table three is the Federal Stock Class (FSC). All DESC stock classes having DMS items are listed. Next to the FSC in column two is the Item Name Code (INC). The INC is a further breakdown within the FSC. For example FSC 5905 has five subgroups of items which together comprise the larger FSC. Column three is the total number of items by INC for each FSC. For example INC 10 of FSC 5905 has a total of 35 DMS items.

The next two portions of Table 3 are decreasing demands after DMS is declared and increasing demands after DMS is declared. Under the decreasing demands section, the NR (number) column indicates the total number of DMS items for an INC with decreasing demands. For example, FSC 5905, INC 10, has a total of 35 items. Thirty-three items are noted to have decreasing demands and two items are associated with increasing demands. The first PCT TOTAL column under decreasing demands and the only PCT TOTAL column under the increasing demand display the percentage of the INC with decreasing or increasing demands. For those items with decreasing demands, an average life is calculated and expressed in quarters. For example under FSC 5905, INC 10, the average life after DMS was one quarter. The recommended life-of-type for the LOT buy is four quarters or one year. The average life column settles most often on twenty-eight quarters or seven years as the recommended life-of-type. The second PCT TOTAL column under decreasing demands is actually two columns. The zero life column indicates the percent of items by INC with zero life after DMS. The life-greater-than-forty-quarters column indicates the percentage of DMS items by INC with activity beyond forty quarters of demand. For example under FSC 5905, Inc 10, 89% of the 33 items with decreasing demands had zero life after DMS was

declared. None of the items had life beyond forty quarters and eleven percent had some demands during the LOT period.

The last section of Table 3 depicts those items with increasing demands. In the example previously cited, INC 10 under FSC 5905, two items of the thirty-five total had increasing demands. This represents 6% of the total items for that INC. It is assumed that all items in this section have experienced demand throughout the forty-quarter LOT period. The recommended life column for calculating the life-of-type period for items with increasing demands is set at forty quarters or ten years. The conclusion drawn from this portion of the DESC study would be that items with decreasing demands should be procured for a 28 quarter LOT period and those items with increasing demands should continue to be procured for a 40 quarter LOT period.

TABLE 3

Life After DMS in Quarters
By INC (10:8)

			DECREASING DEMAND AFTER DMS						INCREASING DEMAND		
FSC	INC	TOTAL NR	NR	PCT TOTAL	AVG LIFE	RECOMMENDED LIFE FOR LOT BUY COMPUTATION	PCT TOTAL ZERO LIFE	PCT TOTAL LIFE >= 40	NR	PCT TOTAL	RECOMMENDED LIFE
5905	10	33	33	94	1	4	89	0	2	6	40
	5311	124	99	80	31	32	35	4	25	20	40
	37405	116	95	82	26	28	27	9	21	18	40
	37406	152	131	86	25	28	25	9	21	14	40
	Other					28					40
5910	7	39	22	56	3	4	46	0	17	44	40
	8	44	34	67	23	24	14	0	10	23	40
	Other					24					40
5925	136	121	89	74	27	28	34	12	32	26	40
	Other					28					40
5930	184	21	19	90	25	28	0	24	2	10	40
	206	9	8	90	13	16	33	0	1	11	40
	399	21	14	67	22	24	5	20	7	33	40
	406	113	92	81	24	24	24	14	21	19	40
	451	23	13	57	26	28	17	0	10	43	40
	2134	29	21	71	24	24	38	14	8	29	40
	Other					28					40
5935	15093	166	132	80	24	24	23	10	34	20	40
	Other					24					40
5945	19759	25	20	80	38	40	36	20	5	20	40
	32512	136	94	69	19	20	22	7	42	31	40
	Other					24					40
5950	208	35	34	97	30	32	32	11	1	3	40
	724	33	28	85	6	8	54	3	5	15	40
	777	35	26	75	23	24	37	3	9	25	40
	780	12	10	83	18	20	50	0	2	17	40
	6338	31	24	77	23	24	58	10	7	23	40
	32496	63	54	85	27	28	50	20	9	15	40
	Other					28					40
5960	1	898	775	86	28	28	5	17	123	14	40
5961	20588	342	289	84	27	28	13	23	53	16	40
	20589	45	36	80	26	28	7	22	9	20	40
	33096	39	27	69	20	20	3	11	12	31	40
	61962	47	37	79	23	24	13	32	10	21	40
	Other					28					40
5962	31778	455	332	73	25	28	14	12	123	27	40
	31779	1380	1010	73	27	28	11	14	370	27	40
	Other					28					40
7025	61638	23	22	16	15	16	0	0	1	4	40
	Other					28					40
OTHER	Other	-	-	-	-	28	-	-	-	-	40

Table 4 displays return rates for both pre and post DMS. A return for credit can occur when an activity finds itself with extra stock beyond its immediate needs. If the stock is serviceable ("A" condition) and if other activities have demands for the item, the source of supply (DESC) may authorize the return. When a return of stock is authorized, the stock in question is physically sent from a using activity to a Defense Logistics Agency (DLA) storage site. The necessary accounting transaction occurs which transfers accountability from the using service and their stock record account back to DLA. If there were no other demands for the item, as is the situation in many DMS cases, authorization for return would not be granted by the source of supply. The service activity may still return the excess stock to DLA but would not receive credit. In other words, the stock is given back to DLA and the service takes a loss on their stock record account. The DLA item manager at the source of supply is then charged to manage the excess by ensuring that sufficient stock is available to support the LOT period and ideally, sending all other excess stock to the nearest Property Disposal Office (PDO) for disposition. The problem with disposing of excess DMS stock is uncertainty about the future. The decision to retain these "free" stocks indefinitely is usually made. After all, the reasoning

TABLE 4

Pre & Post DMS Return Rate
(Rate = Return x 100) (10:9)

INC	PRE-DMS RETURNS RATE = 0 NR	POST-DMS RATE	Reduce LOT Buy By Pct Below	PRE-DMS RATE > 0 NR	PRE-DMS RATE	POST-DMS RATE	Reduce LOT Buy By Pct Below
1	120	11	11	450	18	22	Pre-DMS rate times 1.2
4	267	3	3	64	23	14	Pre-DMS rate times 0.6
6	52	6	6	-	-	-	Pre-DMS rate times 1.0
8	34	6	6	-	-	-	Pre-DMS rate times 1.0
136	44	10	10	30	29	24	Pre-DMS rate times 0.8
406	26	11	11	24	18	21	Pre-DMS rate times 1.2
443	70	2	2	14	17	15	Pre-DMS rate times 0.9
451	10	7	7	11	23	12	Pre-DMS rate times 0.5
886	16	8	8	-	-	-	Pre-DMS rate times 1.0
1938	58	9	9	67	24	18	Pre-DMS rate times 0.7
2134	16	5	5	-	-	-	Pre-DMS rate times 1.0
5311	85	10	10	16	28	45	Pre-DMS rate times 1.6
15077	14	1	1	-	-	-	Pre-DMS rate times 1.0
15093	155	4	4	52	28	21	Pre-DMS rate times 0.8
20588	134	6	6	86	19	18	Pre-DMS rate times 1.0
20589	21	4	4	10	26	17	Pre-DMS rate times 0.7
31778	220	5	5	130	17	13	Pre-DMS rate times 0.8
31779	720	5	5	315	15	16	Pre-DMS rate times 1.0
31959	20	6	6	-	-	-	Pre-DMS rate times 1.0
32512	58	10	10	10	27	16	Pre-DMS rate times 0.6
33096	23	8	8	43	24	27	Pre-DMS rate times 1.0
37405	70	8	8	15	15	6	Pre-DMS rate times 0.4
37406	87	5	5	67	22	20	Pre-DMS rate times 0.9
61638	17	7	7	-	-	-	Pre-DMS rate times 1.0
61924	25	10	10	-	-	-	Pre-DMS rate times 1.0
61925	122	3	3	-	-	-	Pre-DMS rate times 1.0
61962	20	15	15	11	28	26	Pre-DMS rate times 0.9
[illegible]	75	8	8	28	23	17	Pre-DMS rate times 0.7
Total	2,835	6	-	1,610	19	19	Pre-DMS rate times 1.0
Other INCs	-	-	-	-	-	-	Pre-DMS rate times 1.0

goes, no outlay of funds was necessary to obtain this "free" excess stock from the using services. The resulting DESC policy has been not to dispose of excess DMS stock. This

explains why ending balances at LOT year end are often larger than the original investment at LOT year beginning. Table 4 results are derived from 4,445 DMS items in the analysis of pre and post DMS return rates (10:9). Of these items 2,835 or 63% had no returns in the three years just prior to the DMS year. The remaining 37% had a 19% return rate both before and after DMS (10:5). Since returns are previous demands not needed any more and DMS items as a group show decreasing demands, it makes good sense to reduce LOT buy requirements by the amount of forecasted returns (10:5).

Table 4 is divided into two parts: 1) all those items experiencing a pre-DMS return rate of zero and, 2) all those items with a pre-DMS return rate greater than zero. Given that a post-DMS return rate exists for those items in the first category, the applicable return rate by item name code (INC) is applied to future LOT buys in that INC. For example in INC one, of the 120 items, an 11% return rate was recorded. Accordingly, future LOT buys in that INC should be reduced by 11% after final determination quantity is reached.

In the second category of Table 4 are those items with a pre-DMS return rate greater than zero. Given that these items also exhibit a post-DMS return rate, a comparison by INC was made to see the difference. It is noted, for

example, in INC one with 450 items that 18% of those items experienced returns prior to DMS and the same items experienced a 22% return rate after DMS. To factor in the correct reduction amount for returns, the pre-DMS factor was multiplied by the differential percentage between the pre-DMS and Post-DMS return rates. For example, in INC one with 450 DMS items having a pre-DMS return rate greater than zero, the percentage difference between 18% and 22% is 1.2%. Accordingly, the pre-DMS rate was multiplied by 1.2% to yield what would be the expected post-DMS return rate. Table 4 could be used by inventory managers when the requirements determination is being completed on a newly declared DMS item. Apart from the return rate issue, inventory managers already consider such things as stock due in on contract and from using services (returns) as well as stock presently on hand. Based on the results of Table 4, inventory managers at DESC might be justified in reducing future LOT buys to account for projected returns. One major problem with applying the recommended percentage from Table 4 is that not all items experience returns either before or after the declaration of DMS. For example, INC one has a population of 898 items from Table 3. Table 4 indicates that 470 items from INC one experienced returns either before or after DMS was declared. The reduction rate would be applied across-the-board to future LOT buys within

the INC even though the item would have a moderately high posterior probability of not experiencing post-DMS returns. The recommendation of this internal study was to factor in a reduction in the LOT buy based on rates of return by item name code (INC). Additionally, it was recommended that LOT buys be reduced from 40 quarters to 28 quarters for items with decreasing demands prior to DMS. Those DMS items with increasing demands would continue with the 40 quarter LOT period.

Sample Population

The results of this researcher's pilot study suggested a serious over procurement problem at DESC for items bought for long-term support. Coincidentally, DESC was conducting its own internal study of the DMS problem concurrently with this researchers efforts but without exchange of information. A need for a broader study was justified because the pilot study was not complete or extensive enough and it could have been biased. The DESC study used a main-frame computer to analyze the entire population of DMS items. This researcher examined all DMS items from three stock classes. These classes were circuit breakers (5925), connectors and receptacles (5935) and transformers (5950). Federal stock classes 5960, 5961 and 5962 which have the largest numbers of DMS items and the largest dollar investment were not selected because of the volatility and

advancing technology which requires special considerations. For this research to result in some reliable decision rules for DMS procurement, a stable sample was needed for consideration. The added uncertainty associated with these three stock classes (5960, 5961 and 5962) may necessitate a more liberal procurement policy based on a different set of decision rules. What remains are thirty-seven other stock classes with more stable technology bases and consistent demand histories. From the remaining classes, three were selected based on their probable differing levels of technology although, position by stock class on the product life-cycle curve developed by Brooks does not seem to be a factor once DMS occurs, regardless of the FSC (2). Still, it seemed more valid to select several stock classes with all DMS buys for all years rather than an individual LOT year with all stock classes for that year. As in all large bureaucratic organizations, the "mood" concerning DMS investment is subject to change and modification from year to year as politics and budgets dictate. That reason alone is enough to warrant a broader examination based on LOT years using a smaller sample.

The sample size totaled 369 items or about 8% of the population. Eighteen items were excluded from the sample for a variety of reasons including contract history discrepancies, transfer to another DLA agency for management

and new sources becoming available. Documentation was sufficient on the remaining 351 items to compare the effects of Life-of-Type buy reductions.

Data Collection

The internal DESC report ESR11113 served as the major data source for DMS information. An example of this report is exhibited in Table 5. The first column of the report contains the national stock number (NSN). Column two is the disposition indicator code (DISP IND). This code indicates current status of the DMS item since several months may lapse while an item is being procured. As information is being compiled, the status of an item can change until final disposition is completed. The status is represented by a two-digit letter code. These codes are:

BO: a buy out was completed
PR: a purchase request was initiated
NB: a no-buy decision was made
NP: the item was non-procurable
LL: a level load decision was made

Column three is the Life-of-Type year (LOT). The LOT year will always be the ending support year. For example, LOT year 89 was assigned in 1979 for the LOT period 1980-1989 (10 years). The next field in the ESR11113 report is the date of last buy. This Julian date represents the contract award date of the most recent procurement action

Table 5

Monthly Update Process for DMS Items 90 Jun 26

ESR11113 DMS Items Master List Page 64

NSN	DISP IND	LOT YR	DATE LAST BUY	SYS QFD	BUY QFD	AWARD DOLLARS	W/S CD	FCST CD	ORC	CASE NO
5925-00-552-5960		79324	82	1	0	0.00	N		LK	78012
5925-00-561-7329		81098	90	1	0	0.00	N		LK	80070
5925-00-600-7310		79324	89	1	0	0.00	N		LK	79009
5925-00-612-7159	BO	84127	94	1	4	6,337.50	N	D	LK	83059
5925-00-620-5844		79324	89	1	0	0.00	F		LK	79009
5925-00-620-5851		79324	89	1	0	0.00	F		LK	79009
5925-00-620-5861		79324	89	1	0	0.00	H		LK	79009
5925-00-627-0974	BO	84154	94	1	15	66,889.80	N	D	LK	83059
5925-00-628-7795	BO	80234	88	1	0	7,065.00	H	D	LK	79009
5925-00-643-7549		78334	89	1	0	0.00	H		LK	79009
5925-00-650-0690		79324	89	1	0	0.00	N		LK	79009
5925-00-655-1229	BO	85113	94	1	5	3,660.84	N	D	LK	83059
5925-00-677-6593	BO	84117	94	1	8	13,035.40	N	D	LK	83059
5925-00-690-1728	BO	84133	94	1	1	805.00	N	D	LK	83059
5925-00-691-0091	BO	84356	94	1	5	73,476.20	N	D	LK	83059
5925-00-691-0023	NP	85088	NP	1	1	0.00	N		LK	89104
5925-00-694-9607		76186	89	1	0	0.00	N		LK	79009
5925-00-703-3589	BO	84058	94	3	0	13,560.48	N	D	LK	84021
5925-00-704-2295	BO	84274	94	7	27	95,598.28	N	D	LK	83059
5925-00-706-9975	BO	89333	94	1	4	3,517.50	N	D	LK	83059
5925-00-723-4910	BO	84194	94	1	10	14,875.00	R	D	LK	83059
5925-00-723-4912	BO	84216	94	1	4	15,959.70	M	D	LK	83059
5925-00-758-7955	BO	84117	94	1	3	4,057.00	N	D	LK	83059
5925-00-761-0104		81025	90	1	0	0.00	N		LK	80042
5925-00-761-0105		00000	89	1	0	0.00	N		LK	79009
5925-00-763-4103	BO	85090	94	1	1	3,540.65	N	D	LK	85059

against the NSN listed on the same line. This date usually represents the final buy out date for LOT procurement but could also represent a direct-ship procurement for a foreign military customer. LOT buys do not include foreign military requirements. The foreign military may still receive assets at the discretion of the source of supply. If assets are unavailable for the foreign customer or he is otherwise deni

ed stock, his requisition may be placed on direct shipment to him from a vendor or dealer having one or two each of the required item on-hand. Rarely will the original source manu facturer have the item available even for requirements for one or two each. The ESR11113 listing is updated when these direct shipment procurements replace the LOT buy date. Column five is the system quarterly forecast of demand (QFD). As is often the case, the DMS candidate item will be a non-stocked item with less than one demand per quarter. Non-stocked means that there is no requirements "stack" to include lead times, procurement cycle or safety level stock. The stack of requirements would be summed to yield a total requirement for the item for a specific time period. The non-stocked item is merely bought on demand and only on demand. Since DMS policy requires that candidate items be treated as stocked items, the inventory manager fixes a QFD at the lowest level, 1 per quarter. The ten-year or 40-quarter LOT period buy often is for 40 each or one per quarter as a minimum buy quantity in the absence of service projections. It is for this reason that a system QFD of 1 (one) is most evident on the ESR11113 report under the system QFD column. The next column, buy quarterly forecast of demand, may differ from the system QFD based on service forecast. The buy QFD could be higher or lower than the system QFD.

The next column is award dollars. This amount is the actual dollar value at the contract unit price awarded. A deficiency in this listing is the absence of units bought in conjunction with the award dollar amount and the inclusion of a standard price.

The next column is the weapons system code. A code of "N" indicates that the item does not directly support a specific weapons system. A code of "X,Y or Z" indicates a priority weapons system with "X" being of the highest priority followed by "Y" and "Z". Subsequent to the data cut-off date for this study, a new weapons system designator code system was initiated. The new coding involves many additional codes to more exactly identify the weapon system. Since the data are using the old system, the ESR11113 listing dated 31 December 1989 will list the old codes. It is not clear if the new coding increased the percentage of DMS items with weapons codes (currently around 30%).

The forecast code indicates the basis of determining requirements for the LOT buy. A code of "D" means that the forecast was based solely on demands. A code of "S" indicates that only a service projection of future needs was used as a basis for procurement. A code of "B indicates that both service projections and demands were used as a basis for procurement. A quick check of the data base does not reveal great differences in excess stock on-hand as a

result of service forecast as opposed to a forecast based on demands alone. In the sample of 344 items, 81 items indicate that the using service provided input for requirements determination. It cannot be determined from the data what weight was given to service projections when arriving at requirements determinations on those items where the services provided input.

The column headed by ORC is an abbreviation for output routing code. The ORC identifies a particular inventory manager who is responsible for the maintenance and management of the item.

The final column of the ESR11113 report is the case number. A same case number is assigned to each NSN in a group of NSNs being considered for DMS action. When a manufacturer declines to be a continuing source of supply it is usually on a family of like items. A manufacturer submits to the source of supply a list of like items that will be discontinued after a specified date. The source of supply would then decide if LOT procurement was necessary to ensure long-term support. The case number helps to identify groups of NSNs in the procurement process. Buyers are able to group like items together and negotiate price reductions based on total volume. A DMS LOT contract could have dozens of NSNs associated with it, all having the same case number.

The master DMS list ESR11113 is insufficient to determine over procurement excesses for LOT buys. The list does not include current assets on-hand or unit costs. It would be necessary to compare what was currently on-hand with what was originally purchased to analyze the extent of over procurement. To do this a national inventory record (NIR) was obtained through the Standard Automated Materials Management System (SAMMS) at DESC. An example of a NIR is displayed in Table 6.

A current NIR and the ESR11113 report along with the contract interrogations from DESC were sufficient documentation to initiate analysis on over procurement for LOT buys. Because the master DMS list is sequential by NSN it was necessary to assign a factor to each LOT year to equate what was currently on-hand with what would have been expected to have been used at any given point in time, given a straight-line method of inventory draw-down over the lives of the many over-lapping LOT periods.

Table 6

```
DF109     DESC                          NATIONAL INVENTORY RECORD FILE PRINTOUT                    DATE 89135  PAGE 00001

ORC RT  DIC ZCG  RIC S9E  NSN 5935006605855  LOC      ACTION CD BR     PGC          REASON FOR INQUIRY


CATALOG SECTION          IIAS DATA 03 89085  1  ACQ-ADV-CD D   STAND-STAT-CD 2  TYPE-LR-CD    TIC    PHYSEC-CD U    DDLCI 85214
                      *******REFERENCE DATA******* S F  EFF          UNIT        M S            D R W S P **CONV FACT*   FAMILY  D
     NSN      UI KC      NSN      UI UICVF D RIC S S  DATE UNIT PRICE PACK USERS R P CS AD ORC C P C S I R FC  VALUE  D   NUMBER  C

5935006605855 EA CC                00000 0     1 N 88214      74.17 00001 11010 D 1    AA  SM E N N S        0000000 0 006605855 A

MANAGEMENT SECTION        MIQ-CD       WR-CD      LATL-RDIST-ASST Y      IBS HEAD OF FAMILY
                          B D F D I L C                ROP      ROP    ROP  ISSUABLE PROC    UNIT      UNIT    S          C F CLOTH   C
I  MRQ  I  UMIPS  I  MOQ  O I C V C R C  MAP R/L   LEVEL    COMP QTY  DATE   ASSETS  GROUP  WEIGHT    CUBE    L VD  EDOS R I FACTOR  E

0 00003 1 0000001 0 99999 0 1   C H A 1 000000080 0000001 000001151 00000 000001151 00000      .34     .017 0 50 00000      .00000

ASSET BALANCE SECTION
                  O     T   ON-HAND    ACT    F  T   CUT-OFF          M                  O     T   ON-HAND    ACT    F  T   CUT-OFF          M
AC LS  RIC  P  C  P   QUANTITY   DATE   C  I   BALANCE     DATE     I  AC LS  RIC  P  C  P   QUANTITY   DATE   C  I   BALANCE     DATE     I

06  P  SUE  A  A     000000857  89102        000000000  00000        08  S  NOE  A  A     000000053  88141        000000000  00000
02  P  SRE  A  A     000000054  89085        000000000  00000        63  P  FLE  A  A     000000186  88209        000000000  00000
04  P  SME  A  A     000000001  89048        000000000  00000        06  P  SUE  A  L     000000022  87211        000000000  00000

      NSN TOTALS        DLA OWNED      SVC OWNED      ISSUABLE      NON-ISSUABLE      TOTAL ON HAND
                             1173              0          1151                22               1173
```

The factors were as follows:

LOT YEAR	FACTOR
89	1.00
90	.90
91	.80
92	.70
93	.60
94	.50
95	.40
96	.30
97	.20
98	.10
99	.00

A factor of .90 for LOT year 90 simply means that by the end of 1989, 90% of LOT assets should have been issued, assuming a straight-line method of inventory draw-down and that demands actually behave in a straight-line manner. If the consumption rate is different than 90% by the end of calendar year 1989, the forecast for the requirements determination may have been faulty for the LOT buy.

Assumptions and Limitations

This study does not attempt to track LOT year buys over time under differing buy assumptions. Rather, a "snapshot" is taken on 31 December 1989 and based upon statistical analysis at that instant in time, changes in buying rules are tested to observe the effects on stock levels and support capabilities.

Several factors make it difficult to track LOT years under differing buy policies. First, LOT years have different numbers of DMS items and total dollar investment.

For example LOT year 91 is not represented in the sample. Other LOT years are only slightly represented while some are overly represented. Secondly, demand levels differ between federal stock classes. While straight-line demand does not correctly identify over-all demand or even demand within any FSC, it is used by inventory managers for ease of computation when calculating LOT buy quantities and projecting that demand ten years into the future. While exact demand rates by FSC and by INC could be determined, the window of relevancy would be changing continuously if the concept of the product life-cycle is accepted. The question then becomes one of when the rate change is sufficient enough to move the window of relevancy. The window might be best visualized as a rectangle over-laying a segment of the product life cycle curve. As long as an items life cycle falls within the rectangle, a given demand rate could apply. Once outside the rectangle a "new" rate would have to be determined. In short, it would be cumbersome to fix a demand rate by FSC and Inc and have it be meaningful or relevant for any period of time.

Actual demand patterns and how they affect the LOT buy decision is not addressed in this study. Total demand is the primary concern. It is assumed that the LOT assets will be in place and ready for issue within the first year of the LOT period to satisfy total demand. A third reason for

difficulty in tracking LOT year procurement under differing policies and rules is the changing political climate. Over a ten-year period, politics and budgets have an effect on what gets procured. These "changes in attitude" are mostly budget driven and are very subtle and unofficial but sufficient to distort the comparison of LOT buys over time. Lastly, among the factors contributing to inconsistencies in LOT procurement over time, the business cycle may have an effect on the initial declaration of DMS situations. If Diminished Manufacturing Source is a continuing problem, should we not see a consistent generation of new DMS cases over time? Some LOT years are conspicuously under represented while other years are over represented. It could be that ten years is not a sufficiently long time period to evaluate consistency of DMS occurrence. Still, some long-time inventory managers at the Defense Electronics Supply Center in Dayton offer this explanation. When a business cycle takes a down turn and sole source manufacturers are unable to utilize their capacities to the fullest extent, they may individually declare some government items DMS to extort a large LOT buy from the DOD. The astute inventory manager recognizes these bluffs from companies with past histories of false DMS declarations and pressures the procurement personnel to convince the manufacturer to continue production. Other inventory

managers choose to accept at face value a companies decision to stop production and mechanically processes the LOT by requirements. These situational inconsistencies make it difficult to make general statements about the behavior of DMS LOT determinations and therefore complicate efforts to make sense of or track past DMS activity.

While it is recognized that three out of four DMS items experience declining demands both before and after the occurrence of DMS, a straight-line method for LOT year projection was used by default since a demand pattern for DMS items is not defined for the purposes of this study. In reality, it is recognized that most demand on DMS items with declining demand rates occurs at or near the initial LOT year and soon there after. By the fifth year of the LOT periods for those items with declining demand rates, much of the activity ceases. This includes also those petitions for credit on excess stock which might be received from using activities. These observations are supported by the individual trend analysis graphs reviewed for each of the 351 sampled items. Assigning values by FSC and for all 4,400 DMS items along a derived exponential decay curve is far too ambitious for this study. Recognizing perhaps a more realistic five to seven-year LOT period with exponentially declining demands would not work when confronted with an item having increasing demands. Moreover, the inventory

manager may not be able to easily determine if demands are level or increasing at the time of the LOT buy. The availability of a 40-quarter demand history is a recent development. Many demand-driven DMS buys are still based on 8-quarters or less of demand data. The problems of non use of the 40-quarter demand forecast are based in software availability and lack of training. Item managers make the best decisions with the information available to meet time table requirements.

In consideration of demands, one must recognize that whatever demand pattern is observed in the sample, total demand is unaffected. This study does not attempt to specifically identify a DMS demand pattern and match it to some decision rule for long-term procurement. Demands in general, however, have an impact upon the interpretation of the spreadsheet output from the analysis of the three LOT reduction scenarios. The spreadsheets created to analyze the 351 sampled items are contained in Appendixes A, B and C. The analysis occurs at a point in time as opposed to an analysis which covers a period of time. That is to say, if the period of the analysis was for a specific period of time rather than a specific point in time, straight-line demand projection for the LOT period would have no affect on the results. While demands clearly do not occur in a straight-line manner, the analysis assumes that it does. The results

of the three LOT buy reduction scenarios yield actual numbers of items that are expected to have deficient unit balances by the data cut-off date. As already mentioned, there is no attempt to identify a DMS demand pattern but it must be pointed out that a difference exists between the straight-line method for projecting the LOT period into the future and the actual demand pattern exhibited by the 344 items in the study sample. This difference is sufficient enough to distort the results of the analysis in terms of total numbers of items with deficient unit balances under the three LOT reduction scenarios for a given point in time. Because of this discrepancy between what was expected to be on hand at any given point in time and what actually was on hand, the results should be evaluated in the long-term.

Statistical Tests

Data from the master DMS listing ESR11113 report, individual national inventory records, individual procurement histories and individual 40-quarter demand histories on each item in the 351 item sample were entered into a new spreadsheet for analysis. Data of interest included the original LOT buy quantity, the unit balance on hand on 31 December 1989, a usage factor based upon a straight-line projection for future demands, demands and returns-for-credit for the LOT period and the amount in units over/short to expected balances by 31 December 1989.

That is, given a straight-line projection for demands within the LOT period an average expected demand level for a specific point in time could be determined and compared to the actual demand pattern. The expected on-hand quantity for a given point in time could be compared to actual item balances to observe the occurrences of balances being over or short to expected balances.

The decision rule for LOT buy reductions at the 10%, 33% and 50% levels was arbitrarily decided upon. The pilot study had indicated substantial over procurement but it could not be known the acceptable LOT reduction percentages. For this reason two extremes and a moderate level were chosen to provide a broad picture of the effects of the reductions. Those items in the larger 351 item sample with increasing demands (about 12% of the items) would most likely experience stock-outs before the end of the LOT period under current buying policies (8). Conversely, the 79% of the items with decreasing demands would have substantial balances remaining on-hand at the end of the LOT period. The remaining 9% of items exhibited demand patterns which could not be easily categorized as either increasing or decreasing. An examination of the sample demand data output which was similar to the one shown in Table 1, revealed that of the 351 sampled items, 277 of them or 79% demonstrated decreasing demands, 43 of them or 12%

demonstrated increasing demands and 31 items or about 9% had level demands. This study tries to determine how many new items with stock deficiencies would result from the proposed LOT reductions and to weigh those results against the risk of non-support.

III. Findings and Analysis

Discussion

From the four primary data sources a spreadsheet using the Quattro software package was constructed to analyze the data. An example of the spreadsheet is illustrated in Appendix A, B and C. The four sources were the ESR11113 report (Master DMS List), the individual national inventory records (NIR), the DESC individual contract history file and individual 40-quarter demand histories. Additionally, the DESC Enable program was used to construct individual trend graphs for each item. The graphs were used to discover how many items in the sample displayed increasing or decreasing demands. By examining the trend analysis charts for the 351 items sampled, 277 items or about 79% had decreasing demands, 43 items or about 12% had increasing demands and 31 items or about 9% displayed inconsistent or level demand trends. These figures are not in agreement with the most recent DESC study indicating that three of every four items have decreasing demand trends (10:3).

The analysis involved taking a snapshot of DMS items on 31 December 1989. The individual item unit balances of on-hand assets were compared to what would have been expected to have been on-hand at that time. For example, an item from LOT year 95 should have used 40% of its stock by 31

December 1989. Differences from what would have been expected were noted. Original LOT buys were adjusted for demands and credit returns as well as for on-hand balances before the DMS LOT buy.

The original LOT buy quantities for each item in the sample was multiplied by .9, .67 and .5 to arrive at expected balances under each of the three LOT buy reduction scenarios.

The Comparison

The data indicate that under current and past LOT buy policies, shortages to expected item unit balances on 31 December 1989 are deficient for 43 of the 351 items sampled. This deficiency considers actual demands which have occurred and any beginning item balances. One might expect as many as 88 items (25% of the sample) to demonstrate deficient unit balances since one out of four items would be expected to have increasing demands. With increasing demands the item would be very likely to deplete all assets sometime within the LOT period. This assumes an initial straight-line buy based on the then unadjusted-for-trend demand pattern. The difference between number of sampled items displaying deficiencies initially and the number expected to be observed comes from comparing actual demand and expected straight-line demand. If this analysis were covering a specific LOT period, the actual demand pattern would have no

affect on the results. Actual demand rarely or never behaves in a straight-line manner.

Four items of the 351 item sample were out of stock by 31 December 1989. While it is recognized that this out-of-stock sample is small, on average, the period of support was 5.5 years.

Thirty-three percent or 14 of the 43 deficient items directly supports weapons systems. This is slightly higher than the population average (30%).

10% Reduction in LOT Buy

Reducing the LOT buys for the 351 sampled items by 10% resulted in seven additional items demonstrating a deficient unit balance by the 31 December 1989 data cut-off date. This means that seven items in addition to the baseline count of 43 fell short in supporting their entire LOT periods. The already out-of-stock items indicate a probable period of support at 5.5 years. The 10% reduction in the initial LOT buy resulted in a savings of $636,559 and a 2% increase in deficient unit balances. With seven additional items showing deficient unit balances by the cut-off date, four additional weapons systems would likely experience support periods of less than 10 years. This is in addition to the 14 weapons systems showing deficiencies in the baseline count of 43 total deficient items.

33% Reduction in LOT Buys

Reducing the LOT buys for the 351 sampled items by 33% resulted in twelve additional items beyond the 10% reduction quantity of 43 with deficient unit balances. Cumulatively, nineteen additional items would have fallen short in supporting their entire LOT periods. The savings realized from a 33% reduction in the LOT quantity would be $2,073,842 on the sample of 344 items. The decline in weapons systems support would increase from eighteen items to twenty-eight items. This represents 45% of all deficient items at the 67% LOT buy reduction level which includes the weapons systems of the baseline amount and the 10% reduction scenario which would also fall short of receiving support for the entire LOT period. Overall, a decline of 5.4% in support would result from a 33% reduction in the LOT buy quantity.

50% Reduction in LOT Buy

Reducing the LOT buys for the 351 sampled items by 50% resulted in twenty additional items demonstrating a deficient unit balance by the 31 December 1989 data cut-off date. Twenty items of the sample plus the 19 items from the two previous scenarios yields 39 items with deficient unit balances. This added to the baseline quantity of 43 items results in 82 items with deficient unit balances by the cut-off date. The total deficient items would represent 23% of

the sampled data and an increase of 5.7% over the previous scenario of a 33% LOT buy reduction. Savings from a 50% LOT reduction plan would total $3,147,856 for the 351 items sampled. In terms of weapons systems support, nearly half (49%) of all deficient items under the 50% reduction plan support weapons systems. Overall, a decline of 11.1% would result from a 59% LOT buy reduction plan.

IV. Conclusions and Recommendations

Discussion

This study has identified an over procurement problem at the Defense Electronics Supply center, Dayton, Ohio in those cases where long-term Diminished Manufacturing Support is concerned. A straight-line method for requirements determination without regard to trend analysis will likely result in over procurement 79% of the time and under procurement 12% of the time. In the absence of a widely used and working program for trend analysis at DESC, a common sense approach of across-the-board LOT buy reductions is recommended to reduce unnecessary inventory investment.

The question then becomes one of finding an acceptable level of risk to assume when deciding on LOT buy reductions. From the sample of 351 items, a 10% reduction in LOT buys would have resulted in an increase of 2% in those items displaying deficient unit balances by the cut-off date. A 33% reduction in LOT buys for the sample of 351 items, would have resulted in an 3.4% increase in those item displaying a deficient unit balance by the cut-off date. A 50% reduction in LOT buys for the sample of 351 items would have resulted in an 11.1% increase in those items displaying deficient unit balances by the cut-off date.

When considering an acceptable level of risk, the problem of weapons systems non-support is of vital importance. After all, saving investment dollars will be of little use when inoperability results in our inability to wage war or defend this nation. When the three scenarios were applied to the sample, the deterioration of weapons systems support was not constant or proportional. The baseline level of 33% of deficient items supporting weapons systems increased to 49% of the total deficient items at the 50% LOT buy reduction level. This revelation is very disturbing and may require a more liberal buy policy or decision rule for weapons systems items procured for DMS LOT buys.

The conclusion drawn from the DESC internal study on percentages of items with increasing demands and decreasing demands was 75% and 25% respectively (28:4). As discussed previously, those percentages are not verified in the 351 item sample (79% increasing items, 12% decreasing items and 9% items flat or inconsistent). The analysis of the results obtained from the sample in both the baseline and under the three reduction scenarios was inconsistent with what was expected. The baseline results should have indicated 88 items with deficient unit balances (351 X .25) to be consistent with the DESC internal study. The baseline result 43, was roughly half what it should have been.

The assumption in this study has been that, for convenience, a straight-line projection of demands was used to evaluate a stock position at any given point in time. For example, to evaluate an item in the fifth year of a LOT period requires an examination of actual demands with respect to expected demands which assumes a straight-line demand pattern. Any statement about the current stock position is only correct if actual demand behaves in a straight-line manner. Since actual demands seldom or never behave in a straight-line manner, it is assumed that the 351 item sample is identifiable by "some other" demand pattern which this study does not attempt to identify. With the above increased percentages of items with deficient unit balances in mind, the following decision rule is proposed:

> Any reduction in Diminished Manufacturing Source Life-of-Type procurement quantities which result in a percentage increase in expected items with deficient unit balances greater than 10% is an unacceptable level of risk for providing efficient long-term support.

In consideration of the above decision rule, reductions of LOT buys by 10% and 33% are acceptable but a 50% reduction violates the decision rule.

Summary

From the comparisons of expected balances on 31 December 1989 with the three scenarios of proposed LOT by alternatives, a 33% reduction in LOT buys seems to be the

safest benchmark. A 33% reduction results in a 6.4% decline in support which this researcher finds acceptable as a start to reducing DMS inventory investment. Reductions greater than 33% increases the risk of non-support to unacceptable levels.

Recommendations for Further Research

Finding a true demand curve for DMS items by federal stock class and by item name code would help to improve forecast used in requirements determinations. DESC-R and DESC-O personnel would probably assist in retrieving data to support that effort.

Another area of interest for further research is in the lack of input from using activities when making requirements determinations. A model and software package that all services could use would be useful for DLA in tracking assets in the field with multi-service users as well as improving communications between service focal points and the inventory control point.

Appendix A: Diminished Manufacturing Source Life-of-Type Spreadsheet For 90% Buy

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 007 3962	94	4	5	651.89	0	0
5925 00 051 4889	94	42	20	113.95	4	0
5925 00 051 4892	94	262	20	319.28	46	12
5925 00 052 1743	94	10	10	213.95	7	1
5925 00 054 0100	94	21	40	193.6	20	2
5925 00 055 9360	94	15	50	374.12	12	5
5925 00 055 9371	94	17	54	61.48	43	1
5925 00 055 9373	94	13	10	319.2	11	3
5925 00 055 9374	94	4	5	436.77	8	0
5925 00 062 3354	97	5	4	377.5	6	2
5925 00 067 3359	94	7	10	649.22	1	1
5925 00 069 5343	94	15	15	231.38	3	5
5925 00 081 7593	94	12	50	559.58	5	6
5925 00 088 9602	94	53	135	171.22	59	7
5925 00 161 9147	94	15	25	559.58	19	1
5925 00 163 3658	94	7	8	60.95	2	0
5925 00 165 8539	94	7	5	232.72	0	1
5925 00 201 2244	93	6	34	49.11	12	0
5925 00 236 5094	94	5	5	651.89	0	0
5925 00 253 5137	94	26	50	200.23	21	13
5925 00 256 1218	94	6	55	355.01	12	7
5925 00 361 8836	94	8	5	436.77	0	0
5925 00 404 7431	94	13	154	500.02	24	0
5925 00 406 6398	94	0	7	20.45	1	0
5925 00 455 8584	94	2	25	193.6	6	0
5925 00 456 0651	94	18	40	92.75	10	8
5925 00 477 9644	94	35	40	193.6	15	13
5925 00 489 1537	94	60	45	202.82	49	10
5925 00 502 0979	94	49	55	193.6	0	11
5925 00 502 1947	94	16	5	210.45	9	0
5925 00 521 8208	94	88	45	202.82	132	0
5925 00 612 7159	94	10	39	172.25	7	3
5925 00 627 0974	94	22	135	525.2	12	9
5925 00 628 7795	88	1	90	120.89	95	38
5925 00 655 1229	94	0	6	610.14	8	3
5925 00 677 6593	94	46	70	186.22	21	4
5925 00 690 1728	94	7	14	60.95	1	1
5925 00 691 0019	94	41	155	474.04	39	0
5925 00 703 3589	94	192	516	27.85	559	292
5925 00 704 2295	94	0	131	356.71	12	47
5925 00 723 4910	94	35	70	212.5	28	11
5925 00 723 4912	94	17	30	223.12	13	5
5925 00 758 7955	94	14	10	434.09	6	7

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
9	0.5	5	4	4	1	4	325.94	651.89
58	0.5	31	27	30	2	26	227.9	227.9
248	0.5	141	107	140	2	106	638.56	638.56
14	0.5	10	4	10	1	3	213.95	213.95
43	0.5	31	12	29	4	10	774.4	774.4
58	0.5	33	25	30	5	23	1870.6	1870.6
29	0.5	36	-7	33	6	-10	331.99	368.88
15	0.5	12	3	11	1	3	319.2	319.2
1	0.5	5	-4	4	1	-4	218.38	436.77
5	0.2	7	-2	6	1	-2	151	377.5
17	0.5	9	8	8	1	8	649.22	649.22
32	0.5	15	17	14	2	16	347.07	462.76
63	0.5	31	32	29	5	29	2797.9	2797.9
136	0.5	94	42	87	14	35	2311.5	2397.08
22	0.5	20	2	19	3	0	1399	1678.74
13	0.5	8	5	7	1	5	48.76	60.95
13	0.5	6	7	6	1	6	116.36	232.72
28	0.6	16	12	15	3	10	166.97	147.33
10	0.5	5	5	5	1	4	325.94	651.89
68	0.5	38	30	36	5	27	1001.1	1001.15
56	0.5	31	25	28	6	22	1952.6	2130.06
13	0.5	7	6	6	1	6	218.38	436.77
143	0.5	84	59	76	15	52	7700.3	7500.3
6	0.5	4	2	3	1	2	14.315	20.45
21	0.5	14	7	12	3	6	484	580.8
56	0.5	29	27	27	4	25	371	371
73	0.5	38	35	36	4	33	774.4	774.4
66	0.5	53	13	50	5	11	912.69	1014.1
115	0.5	52	63	49	6	60	1064.8	1161.6
12	0.5	11	1	10	1	1	105.22	210.45
1	0.5	67	-66	64	5	-68	912.69	1014.1
45	0.5	25	20	23	4	18	671.78	689
154	0.5	79	75	72	14	68	7090.2	7352.8
34	1	0	34	0	9	25	1088	1088.01
1	0.5	3	-2	3	1	-3	366.08	610.14
99	0.5	58	41	55	7	37	1303.5	1303.54
21	0.5	11	10	10	1	10	85.33	60.95
157	0.5	98	59	90	16	51	7347.6	7584.64
441	0.5	354	87	328	52	61	1437.1	1448.2
166	0.5	66	100	59	13	94	4672.9	4637.23
88	0.5	53	35	49	7	32	1487.5	1487.5
39	0.5	24	15	22	3	14	669.36	669.36
25	0.5	12	13	12	1	12	434.09	434.09

NSN	LOT Yr	Beg O/H	LOT Qty	Cost U/P	Dem Qty	Cred Ret
5925 00 763 4103	94	8	10	215.02	6	2
5925 00 763 6985	94	5	25	186.59	8	7
5925 00 782 0113	94	489	600	135.51	1009	52
5925 00 785 7882	94	0	33	32.95	28	0
5925 00 809 5627	94	220	61	223.12	280	0
5925 00 816 5263	94	19	5	464.43	0	0
5925 00 821 8602	94	136	90	191.79	0	0
5925 00 826 8813	94	23	20	209.45	26	0
5925 00 828 9725	94	0	5	651.89	0	0
5925 00 835 2059	94	38	55	563.9	14	0
5925 00 837 6203	94	5	10	222.5	0	0
5925 00 837 6637	94	18	10	649.22	1	0
5925 00 838 2648	94	12	50	70.87	10	0
5925 00 839 3889	94	0	23	174.78	3	0
5925 00 848 7917	95	130	100	495.65	230	3
5925 00 849 2703	94	144	1127	353.11	578	48
5925 00 849 2765	94	12	20	162.5	9	0
5925 00 849 2766	94	4	5	651.89	0	0
5925 00 849 2767	94	3	23	60.95	0	0
5925 00 850 8145	94	70	5	70.87	9	0
5925 00 850 8146	94	80	35	193.6	8	4
5925 00 853 1995	94	40	15	221.97	0	4
5925 00 877 8066	94	15	89	60.95	33	16
5925 00 879 0971	94	0	337	110.4	438	165
5925 00 879 5108	94	45	40	569.22	6	4
5925 00 883 7656	94	34	40	60.38	12	0
5925 00 883 7657	94	11	55	193.6	7	0
5925 00 883 7660	94	22	5	60.95	16	2
5925 00 883 7670	94	23	28	60.95	7	3
5925 00 883 7673	94	8	5	70.87	0	0
5925 00 892 9932	94	14	30	379.86	17	0
5925 00 897 0644	94	62	195	169.62	51	11
5925 00 900 5934	94	0	100	20.41	77	0
5925 00 903 1640	94	5	5	225.18	0	0
5925 00 916 0367	94	6	20	177.55	1	0
5925 00 920 6437	94	7	20	230.31	32	7
5925 00 923 4152	94	0	8	604.25	8	0
5925 00 925 7840	94	5	30	559.58	3	0
5925 00 929 7272	94	1	5	225.18	3	2
5925 00 931 0315	94	6	20	403.2	2	3
5925 00 934 2842	94	1	15	689.56	18	2
5925 00 940 3003	94	68	85	202.82	39	10
5925 00 945 3426	94	13	5	651.89	0	0

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
14	0.5	9	5	9	1	4	2150.2	1935.18
29	0.5	15	14	14	3	12	4664.8	4198.275
132	0.5	545	-413	515	60	-443	81306	73175.4
5	0.5	17	-12	15	3	-13	1087.4	978.615
1	0.5	141	-140	138	6	-143	13610	12249.29
24	0.5	12	12	12	1	11	2322.2	2089.935
226	0.5	113	113	109	9	108	17261	15534.99
17	0.5	22	-5	21	2	-6	4189	3770.1
5	0.5	3	2	2	1	2	3259.4	2933.505
79	0.5	47	32	44	6	29	31015	27913.05
15	0.5	8	7	7	1	7	2225	2002.5
27	0.5	14	13	14	1	12	6492.2	5842.98
52	0.5	31	21	29	5	18	3543.5	3189.15
36	0.5	12	24	11	2	23	4019.9	3617.946
3	0.4	138	-135	132	10	-139	49565	44608.5
741	0.5	636	105	579	113	49	397955	358159.5
23	0.5	16	7	15	2	6	3250	2925
9	0.5	5	4	4	1	4	3259.4	2933.505
26	0.5	13	13	12	2	12	1401.9	1261.665
66	0.5	38	28	37	1	28	354.35	318.915
111	0.5	58	53	56	4	51	6776	6098.4
59	0.5	28	31	27	2	30	3329.6	2996.595
87	0.5	52	35	48	9	30	5424.6	4882.095
64	0.5	169	-105	152	34	-122	37205	33484.32
83	0.5	43	40	41	4	38	22769	20491.92
62	0.5	37	25	35	4	23	2415.2	2173.68
59	0.5	33	26	30	6	23	10648	9583.2
13	0.5	14	-1	13	1	-1	304.75	274.275
47	0.5	26	21	24	3	20	1706.6	1535.94
13	0.5	7	6	6	1	6	354.35	318.915
27	0.5	22	5	21	3	3	11396	10256.22
217	0.5	129	88	119	20	78	33076	29768.31
23	0.5	50	-27	45	10	-32	2041	1836.9
10	0.5	5	5	5	1	4	1125.9	1013.31
25	0.5	13	12	12	2	11	3551	3195.9
2	0.5	14	-12	13	2	-13	4606.2	4145.58
0	0.5	4	-4	4	1	-5	4834	4350.6
32	0.5	18	14	16	3	13	16787	15108 66
5	0.5	3	2	3	1	1	1125.9	1013.31
27	0.5	13	14	12	2	13	8064	7257.6
0	0.5	8	-8	7	2	-9	10343	9309.06
124	0.5	77	47	72	9	43	17240	15515.73
18	0.5	9	9	9	1	8	3259.4	2933.505

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 946 7775	94	32	45	187.14	36	7
5925 00 950 2467	94	6	18	177.55	5	0
5925 00 964 3981	94	75	155	499.29	42	20
5925 00 981 2150	94	18	3	112.5	10	2
5925 00 985 0908	94	9	30	606.14	0	3
5925 00 990 2739	94	0	8	167.5	0	0
5925 01 004 2475	94	9	15	226.25	2	0
5925 01 023 5398	94	6	5	225.18	0	0
5925 01 032 1122	94	225	18	138.63	253	27
5925 01 093 4379	95	23	2	207.46	16	1
5925 01 130 5343	94	0	45	180.94	59	17
5925 01 159 7595	94	43	100	169.75	74	3
5935 00 014 6472	95	21	189	51.65	71	1
5935 00 054 6559	95	574	371	27.8	439	78
5935 00 055 7939	95	43	117	23.82	7	0
5935 00 056 9694	95	0	3	8.53	2	0
5935 00 057 0308	95	8	257	82.25	0	4
5935 00 057 5830	95	45	50	156.78	28	20
5935 00 062 1142	95	39	79	35.95	23	1
5935 00 065 9803	97	0	29	14.84	9	17
5935 00 067 4688	92	217	392	140.41	187	46
5935 00 067 4695	92	63	296	152.51	73	40
5935 00 069 5500	95	10	108	31.57	13	3
5935 00 069 5502	95	20	100	23.79	26	0
5935 00 069 5510	95	14	153	24.34	17	[illegible]
5935 00 078 9337	95	19	222	96.27	26	1
5935 00 080 7586	95	0	156	9.44	189	33
5935 00 081 7211	92	145	100	112.01	181	12
5935 00 083 5050	92	243	813	59.1	474	121
5935 00 087 8550	95	0	73	18.57	4	0
5935 00 087 8552	95	35	121	18.16	16	0
5935 00 088 8108	95	61	100	40.32	24	0
5935 00 088 8650	95	80	170	33.99	64	15
5935 00 089 2893	95	93	311	31.9	42	1
5935 00 089 6611	95	12	225	28.67	23	8
5935 00 089 6978	95	118	100	33.27	2	5
5935 00 089 8868	96	453	500	21.1	358	978
5935 00 103 7374	87	204	50	244.82	264	31
5935 00 106 6100	93	107	110	2.54	102	0
5935 00 119 3192	92	8	10	307.4	8	2
5935 00 119 3201	92	28	10	310.55	11	23
5935 00 138 1454	96	15	500	22.4	90	11
5935 00 160 3332	96	64	500	27.9	49	3

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
48	0.5	39	9	36	5	7	8421.3	7579.17
19	0.5	12	7	11	2	6	3195.9	2876.31
208	0.5	115	93	107	16	85	77390	69650.96
13	0.5	11	2	10	1	2	337.5	303.75
42	0.5	20	22	18	3	21	18184	16365.78
8	0.5	4	4	4	1	3	1340	1206
22	0.5	12	10	11	2	9	3393.8	3054.375
11	0.5	6	5	5	1	5	1125.9	1013.31
17	0.5	122	-105	121	2	-106	2495.3	2245.806
10	0.4	15	-5	14	1	-5	414.92	373.428
3	0.5	23	-20	20	5	-22	8142.3	7328.07
72	0.5	72	0	67	10	-5	16975	15277.5
140	0.4	126	14	115	19	6	9761.9	8785.665
584	0.4	567	17	545	37	2	10314	9282.42
153	0.4	96	57	89	12	52	2786.9	2508.246
1	0.6	2	-1	1	1	-1	25.59	23.031
269	0.4	159	110	143	26	100	21138	19024.42
87	0.4	57	30	54	5	28	7839	7055.1
96	0.4	71	25	66	8	22	2840.1	2556.045
37	0.2	23	14	21	3	13	430.36	387.324
468	0.7	183	285	171	39	258	55041	49536.65
326	0.7	108	218	99	30	197	45143	40628.66
108	0.4	71	37	64	11	33	3409.6	3068.604
94	0.4	72	22	66	10	18	2379	2141.1
155	0.4	100	55	91	15	49	3800.5	3420.468
216	0.4	145	71	131	22	63	21372	19234.75
0	0.4	94	-94	84	16	-100	1472.6	1325.376
76	0.7	4	72	71	10	-5	11201	10080.9
703	0.7	317	386	293	81	329	48048	43243.47
69	0.4	44	25	40	7	22	1355.6	1220.049
140	0.4	94	46	86	12	42	2197.4	1977.624
137	0.4	97	40	91	10	36	4032	3628.8
201	0.4	150	51	140	17	44	5778.3	5200.47
363	0.4	242	121	224	31	108	9920.9	8928.81
222	0.4	142	80	128	23	71	6450.8	5805.675
221	0.4	131	90	125	10	86	3327	2994.3
1573	0.3	667	906	632	50	891	10550	9495
21	1	0	21	0	5	16	12241	11016.9
115	0.6	87	28	82	11	22	279.4	251.46
12	0.7	5	7	5	1	6	3074	2766.6
50	0.7	11	39	11	1	38	3105.5	2794.95
436	0.3	361	75	326	50	60	11200	10080
518	0.3	395	123	360	50	108	13950	12555

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 163 3334	96	146	500	62.1	38	8
5935 00 173 7277	87	716	275	71.49	955	37
5935 00 184 7368	92	29	111	183.57	74	42
5935 00 189 6245	93	1427	10838	1.43	3734	1096
5935 00 227 7094	92	82	250	160.87	80	16
5935 00 235 8525	87	275	25	160.96	323	35
5935 00 250 0905	87	30	118	113.5	166	136
5935 00 259 3318	93	430	1921	1.99	1747	115
5935 00 259 6044	87	97	200	15.78	268	76
5935 00 274 1986	96	0	172	42.05	2	5
5935 00 328 3755	95	25	500	9.31	129	40
5935 00 333 7508	96	14	100	333.22	27	0
5935 00 365 9400	95	7	100	118.88	15	0
5935 00 396 6852	95	45	244	15.89	24	0
5935 00 412 1219	93	5	50	2.18	22	0
5935 00 439 0551	92	30	96	170	13	6
5935 00 450 5139	96	0	485	20.1	35	2
5935 00 455 4678	92	29	55	206.77	23	19
5935 00 455 9595	95	2	100	22.15	0	0
5935 00 472 0288	92	3	50	15.04	36	0
5935 00 476 6315	92	76	775	2.08	111	0
5935 00 487 5789	96	69	174	210	154	11
5935 00 497 5688	95	40	500	12.77	93	6
5935 00 497 9198	92	196	617	9.53	175	209
5935 00 497 9200	92	108	1000	3.31	300	7
5935 00 497 9202	92	479	1436	2.12	253	39
5935 00 497 9203	92	1628	6411	2.17	4033	242
5935 00 497 9204	92	324	1093	1.92	272	5
5935 00 498 5639	92	148	1849	8.86	168	35
5935 00 498 5641	92	156	344	5.48	285	0
5935 00 498 5642	92	196	365	3.03	424	124
5935 00 501 0948	96	30	500	15.53	24	5
5935 00 503 9885	96	31	500	22.35	15	0
5935 00 520 5235	93	12	10	6.45	1	0
5935 00 523 9462	87	313	250	67.31	416	1
5935 00 557 2514	89	9	613	147.54	20	5
5935 00 578 9329	93	863	10	37.49	335	78
5935 00 603 7706	93	35	110	23.1	39	2
5935 00 603 7707	93	138	262	10.93	157	9
5935 00 605 6714	96	10	500	18.28	4	0
5935 00 615 3637	95	17	100	22.62	17	9
5935 00 628 6513	96	27	103	95.1	39	3
5935 00 631 4156	97	17	98	1021.57	56	14

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
616	0.3	452	164	417	50	149	31050	27945
73	1	0	73	0	28	45	19660	17693.77
108	0.7	42	66	39	11	58	20376	18338.64
9627	0.6	4906	4721	4472	1084	4071	15498	13948.51
268	0.7	100	168	92	25	151	40218	36195.75
12	1	0	12	0	3	9	4024	3621.6
118	1	0	118	0	12	106	13393	12053.7
719	0.6	940	-221	864	192	-337	3822.8	3440.511
105	1	0	105	0	20	85	3156	2840.4
175	0.3	120	55	109	17	49	7232.6	6509.34
436	0.4	315	121	285	50	101	4655	4189.5
87	0.3	80	7	73	10	4	33322	29989.8
92	0.4	64	28	58	10	24	11888	10699.2
265	0.4	173	92	159	24	82	3877.2	3489.444
33	0.6	22	11	20	5	8	109	98.1
119	0.7	38	81	35	10	74	16320	14688
452	0.3	340	112	305	49	98	9748.5	8773.65
80	0.7	25	55	23	6	51	11372	10235.11
102	0.4	61	41	55	10	37	2215	1993.5
17	0.7	16	1	14	5	-2	752	676.8
740	0.7	255	485	232	78	430	1612	1450.8
100	0.3	170	-70	158	17	-75	36540	32886
453	0.4	324	129	294	50	109	6385	5746.5
847	0.7	244	603	225	62	560	5880	5292.009
815	0.7	332	483	302	100	413	3310	2979
1701	0.7	575	1126	531	144	1026	3044.3	2739.888
4248	0.7	2412	1836	2219	641	1388	13912	12520.68
1150	0.7	425	725	392	109	649	2098.6	1888.704
1864	0.7	599	1265	544	185	1135	16382	14743.93
215	0.7	150	65	140	34	41	1885.1	1696.608
261	0.7	168	93	157	37	67	1105.9	995.355
511	0.3	371	140	336	50	125	7765	6988.5
516	0.3	372	144	337	50	129	11175	10057.5
21	0.6	9	12	8	1	12	64.5	58.05
148	1	0	148	0	25	123	16828	15144.75
607	1	0	607	0	61	546	90442	81397.82
616	0.6	349	267	349	1	266	374.9	337.41
108	0.6	58	50	54	11	43	2541	2286.9
252	0.6	160	92	150	26	76	2863.7	2577.294
506	0.3	357	149	322	50	134	9140	8226
109	0.4	70	39	64	10	35	2262	2035.8
94	0.3	91	3	84	10	0	9795.3	8815.77
73	0.2	92	-19	84	10	-21	100114	90102.47

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 660 5590	93	630	4110	2.34	1998	490
5935 00 660 5846	92	1547	2809	68.36	2542	378
5935 00 660 5854	93	0	15	5.05	12	2
5935 00 660 5855	92	722	1402	81.11	1245	281
5935 00 670 0033	95	231	1104	35.07	334	29
5935 00 679 0479	93	0	63	1.72	6	0
5935 00 683 1402	93	227	210	5.25	389	30
5935 00 683 2312	92	11	9	158.77	19	13
5935 00 683 5102	95	0	100	26.5	56	0
5935 00 687 1122	95	138	357	90.02	274	11
5935 00 689 4662	92	1	50	215.05	26	25
5935 00 704 6020	87	41	35	277.47	16	0
5935 00 705 9887	95	1	100	34.84	19	0
5935 00 726 4204	92	51	240	181.97	288	45
5935 00 730 4145	95	7	113	18.04	9	0
5935 00 755 6213	95	182	316	42.28	288	8
5935 00 761 3235	95	0	100	74.13	97	2
5935 00 761 4344	92	35	50	317.68	12	0
5935 00 767 5154	95	59	100	32.97	21	19
5935 00 769 5490	95	20	100	80.06	1	1
5935 00 781 3036	95	0	100	18.88	5	0
5935 00 787 3534	95	47	156	17.33	36	8
5935 00 791 5476	95	3	100	119.81	1	0
5935 00 799 3054	95	74	500	12.17	153	2
5935 00 804 2942	95	16	100	57.06	1	0
5935 00 804 2957	95	31	100	48.84	0	52
5935 00 805 3463	95	64	158	59.47	41	9
5935 00 805 3946	95	20	188	167.43	25	5
5935 00 805 4664	95	93	328	50.08	142	18
5935 00 806 7509	92	698	1400	78.81	1343	263
5935 00 807 9629	95	171	511	89.55	187	42
5935 00 811 8635	92	315	786	98.9	585	236
5935 00 812 2554	87	66	100	92.44	134	28
5935 00 813 0030	95	45	500	9.8	38	3
5935 00 814 5798	95	169	100	43.82	115	7
5935 00 814 5814	95	74	100	47.48	16	36
5935 00 814 5815	95	78	113	40.46	16	12
5935 00 820 9501	92	76	1100	55.02	346	56
5935 00 823 0295	95	192	323	32.47	144	30
5935 00 827 5022	96	0	500	18.96	613	127
5935 00 836 9653	95	14	100	34.72	0	0
5935 00 838 2762	87	338	57	196.56	273	122
5935 00 842 1374	95	7	100	28.1	1	0
5935 00 842 1376	95	72	100	72.56	3	2

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
3232	0.6	1896	1336	1732	411	1089	9617.4	8655.66
2192	0.7	1307	885	1223	281	688	192023	172820.9
5	0.6	6	-1	5	2	-2	75.75	68.175
1160	0.7	637	523	595	140	425	113716	102344.6
1030	0.4	801	229	735	110	185	38717	34845.55
57	0.6	25	32	23	6	28	108.36	97.524
78	0.6	175	-97	166	21	-109	1102.5	992.25
14	0.7	6	8	6	1	7	1428.9	1286.037
44	0.4	60	-16	54	10	-20	2650	2385
232	0.4	297	-65	275	36	-79	32137	28923.43
50	0.7	15	35	14	5	31	10753	9677.25
60	1	0	60	0	4	56	9711.5	8740.305
82	0.4	61	21	55	10	17	3484	3135.6
48	0.7	87	-39	80	24	-56	43673	39305.52
111	0.4	72	39	65	11	35	2038.5	1834.668
218	0.4	299	-81	280	32	-94	13360	12024.43
5	0.4	60	-55	54	10	-59	7413	6671.7
73	0.7	26	47	24	5	44	15884	14295.6
157	0.4	94	63	89	10	58	3297	2967.3
120	0.4	72	48	66	10	44	8006	7205.4
95	0.4	60	35	54	10	31	1888	1699.2
175	0.4	122	53	112	16	47	2703.5	2433.132
102	0.4	62	40	56	10	36	11981	10782.9
423	0.4	344	79	314	50	59	6085	5476.5
115	0.4	70	45	64	10	41	5706	5135.4
183	0.4	79	104	73	10	100	4884	4395.6
190	0.4	133	57	124	16	50	9396.3	8456.634
188	0.4	125	63	113	19	56	31477	28329.16
297	0.4	253	44	233	33	31	16426	14783.62
1018	0.7	629	389	587	140	291	110334	99300.6
537	0.4	409	128	379	51	107	45760	41184.04
752	0.7	330	422	307	79	366	77735	69961.86
60	1	0	60	0	10	50	9244	8319.6
510	0.4	327	183	297	50	163	4900	4410
161	0.4	161	0	155	10	-4	4382	3943.8
194	0.4	104	90	98	10	86	4748	4273.2
187	0.4	115	72	108	11	68	4572	4114.782
886	0.7	353	533	320	110	456	60522	54469.8
401	0.4	309	92	290	32	79	10488	9439.029
14	0.3	350	-336	315	50	-351	9480	8532
114	0.4	68	46	62	10	42	3472	3124.8
244	1	0	244	0	6	238	11204	10083.6
106	0.4	64	42	58	10	38	2810	2529
171	0.4	103	68	97	10	64	7256	6530.4

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 842 9045	87	409	176	139.63	411	156
5935 00 843 0144	87	25	25	424.61	24	3
5935 00 845 7508	95	120	300	32.34	35	0
5935 00 856 2872	95	2	100	40.86	4	11
5935 00 872 4730	97	13	240	88.47	34	5
5935 00 872 6853	87	47	25	76.52	41	3
5935 00 878 1603	96	0	500	11.9	280	0
5935 00 878 1604	96	0	100	44.76	36	75
5935 00 879 8440	92	80	410	254	215	28
5935 00 883 5868	92	15	30	143.12	10	1
5935 00 884 3427	96	34	2500	35.85	235	4
5935 00 886 9796	87	13	25	142.04	11	5
5935 00 888 3708	96	296	500	9.48	319	31
5935 00 897 4610	95	10	100	28.09	2	2
5935 00 900 0859	95	0	100	36.99	3	0
5935 00 900 1239	96	14	500	8.15	10	0
5935 00 900 1987	95	95	203	26.27	24	6
5935 00 900 1989	95	11	100	38.08	5	1
5935 00 900 1990	95	8	100	38.46	12	2
5935 00 900 1992	95	2	100	53.68	0	3
5935 00 900 1997	95	52	100	18.95	10	10
5935 00 900 2001	95	28	164	31.88	14	10
5935 00 900 2002	95	29	100	55.66	18	3
5935 00 900 2003	95	4	100	38.16	0	1
5935 00 900 2076	95	27	100	19.92	0	0
5935 00 901 5912	95	20	100	23.49	0	4
5935 00 905 6652	95	60	182	25.41	16	34
5935 00 905 9676	92	257	850	72.05	553	131
5935 00 910 9280	92	8	25	245.91	3	3
5935 00 911 9871	93	414	37	2.98	331	0
5935 00 912 1432	93	83	31	4.56	84	0
5935 00 912 1436	93	414	1010	1.39	306	0
5935 00 912 1498	93	219	515	1.81	176	0
5935 00 912 6393	95	43	100	40.57	67	10
5935 00 912 7813	95	25	100	26.71	38	5
5935 00 913 7613	92	9	25	324.74	10	6
5935 00 916 0413	95	115	251	27.4	100	18
5935 00 916 0514	92	29	16	298.99	36	20
5935 00 916 0641	92	40	10	396.23	0	7
5935 00 917 3325	95	4	100	59.15	0	4
5935 00 919 0562	96	206	500	31.6	174	14
5935 00 923 4874	92	7	25	284.49	29	8
5935 00 937 7371	93	8	50	6.17	5	0

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
330	1	0	330	0	18	312	24575	22117.39
29	1	0	29	0	3	26	10615	9553.725
385	0.4	252	133	234	30	121	9702	8731.8
109	0.4	61	48	55	10	44	4086	3677.4
224	0.2	202	22	183	24	17	21233	19109.52
34	1	0	34	0	3	31	1913	1721.7
220	0.3	350	-130	315	50	-145	5950	5355
139	0.3	70	69	63	10	66	4476	4028.4
303	0.7	147	156	135	41	127	104140	93726
36	0.7	14	22	13	3	20	4293.6	3864.24
2303	0.3	1774	529	1599	250	454	89625	80662.5
32	1	0	32	0	3	29	3551	3195.9
508	0.3	557	-49	522	50	-64	4740	4266
110	0.4	66	44	60	10	40	2809	2528.1
97	0.4	60	37	54	10	33	3699	3329.1
504	0.3	360	144	325	50	129	4075	3667.5
280	0.4	179	101	167	20	93	5332.8	4799.529
107	0.4	67	40	61	10	36	3808	3427.2
98	0.4	65	33	59	10	29	3846	3461.4
105	0.4	61	44	55	10	40	5368	4831.2
152	0.4	91	61	85	10	57	1895	1705.5
188	0.4	115	73	106	16	66	5228.3	4705.488
114	0.4	77	37	71	10	33	5566	5009.4
105	0.4	62	43	56	10	39	3816	3434.4
127	0.4	76	51	70	10	47	1992	1792.8
124	0.4	72	52	66	10	48	2349	2114.1
260	0.4	145	115	134	18	108	4624.6	4162.158
685	0.7	332	353	307	85	293	61243	55118.25
33	0.7	10	23	9	3	21	6147.8	5532.975
120	0.6	180	-60	179	4	-63	110.26	99.234
30	0.6	46	-16	44	3	-17	141.36	127.224
1118	0.6	570	548	529	101	488	1403.9	1263.51
558	0.6	294	264	273	52	233	932.15	838.935
86	0.4	86	0	80	10	-4	4057	3651.3
92	0.4	75	17	69	10	13	2671	2403.9
30	0.7	10	20	9	3	18	8118.5	7306.65
284	0.4	220	64	205	25	54	6877.4	6189.66
29	0.7	14	15	13	2	14	4783.8	4305.456
57	0.7	15	42	15	1	41	3962.3	3566.07
108	0.4	62	46	56	10	42	5915	5323.5
546	0.3	494	52	459	50	37	15800	14220
11	0.7	10	1	9	3	-1	7112.3	6401.025
53	0.6	23	30	21	5	27	308.5	277.65

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 938 7299	95	11	100	27.56	8	0
5935 00 946 1272	96	28	500	7.6	42	3
5935 00 947 2925	95	48	500	18.5	487	115
5935 00 951 2154	87	158	100	230.5	176	26
5935 00 952 2204	95	152	100	37.51	30	13
5935 00 954 3147	96	19	500	13	5	7
5935 00 954 7895	95	23	100	19.65	7	10
5935 00 954 7896	95	5	100	29.84	9	0
5935 00 954 9050	95	37	196	21.81	154	44
5935 00 954 9064	95	18	100	22.14	3	5
5935 00 954 9072	95	53	254	28.44	87	11
5935 00 954 9076	95	45	100	25.16	26	7
5935 00 956 4983	92	20	40	176.44	1	11
5935 00 956 8340	99	28	144	95.54	30	22
5935 00 956 8341	99	63	113	81.6	63	15
5935 00 957 8473	95	109	100	20.75	45	10
5935 00 957 8480	95	72	100	31.64	14	9
5935 00 958 7507	95	182	622	43.39	120	61
5935 00 959 8561	95	36	100	56.12	22	8
5935 00 962 0221	96	26	500	15.9	2	3
5935 00 967 1272	92	224	350	194.34	34	82
5935 00 967 1273	88	751	800	154.27	473	39
5935 00 967 1279	87	481	108	181.58	78	14
5935 00 967 1288	92	52	1325	18.03	123	30
5935 00 967 1291	92	85	500	174.38	80	22
5935 00 967 1295	92	166	550	186.19	123	48
5935 00 967 1308	92	84	250	309.85	165	26
5935 00 967 1310	92	54	400	349.77	84	7
5935 00 967 1311	87	41	375	346.86	88	0
5935 00 968 6929	87	212	145	3.01	182	54
5935 00 972 3151	92	315	2000	76.27	1169	201
5935 00 974 5683	92	1039	350	5.76	1011	0
5935 00 974 5684	92	99	1625	136.52	380	47
5935 00 974 5685	92	871	1425	149.55	494	33
5935 00 974 6929	95	23	100	13.05	8	0
5935 00 976 0023	92	546	1700	148.57	443	45
5935 00 976 4811	95	38	121	26.93	10	12
5935 00 977 5821	92	11	30	223.28	2	2
5935 00 983 5978	95	5	311	17.44	3	2
5935 00 983 8873	87	25	50	183.93	40	10
5935 00 988 5945	95	99	235	23.95	49	17
5935 00 989 0900	95	12	100	41.03	110	9
5935 00 989 5998	92	128	675	94.27	398	106

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
103	0.4	67	36	61	10	32	2756	2480.4
489	0.3	370	119	335	50	104	3800	3420
176	0.4	329	-153	299	50	-173	9250	8325
108	1	0	108	0	10	98	23050	20745
235	0.4	151	84	145	10	80	3751	3375.9
521	0.3	363	158	328	50	143	6500	5850
126	0.4	74	52	68	10	48	1965	1768.5
96	0.4	63	33	57	10	29	2984	2685.6
123	0.4	140	-17	128	20	-25	4274.8	3847.284
120	0.4	71	49	65	10	45	2214	1992.6
231	0.4	184	47	169	25	37	7223.8	6501.384
126	0.4	87	39	81	10	35	2516	2264.4
70	0.7	18	52	17	4	49	7057.6	6351.84
164	0.3	120	44	111	14	39	13758	12381.98
128	0.3	123	5	116	11	1	9220.8	8298.72
174	0.4	125	49	119	10	45	2075	1867.5
167	0.4	103	64	97	10	60	3164	2847.6
745	0.4	482	263	445	62	238	26989	24289.72
122	0.4	82	40	76	10	36	5612	5050.8
527	0.4	316	211	286	50	191	7950	7155
622	0.7	172	450	162	35	425	68019	61217.1
1117	1	0	1117	0	80	1037	123416	111074.4
525	1	0	525	0	11	514	19611	17649.58
1284	0.7	413	871	373	133	778	23890	21500.78
527	0.7	176	351	161	50	316	87190	78471
641	0.7	215	426	198	55	388	102405	92164.05
195	0.7	100	95	93	25	77	77463	69716.25
377	0.7	136	241	124	40	213	139908	125917.2
328	1	0	328	0	38	290	130073	117065.3
229	1	0	229	0	15	214	436.45	392.805
1347	0.7	695	652	635	200	512	152540	137286
378	0.7	417	-39	406	35	-63	2016	1814.4
1391	0.7	517	874	468	163	760	221845	199660.5
1835	0.7	689	1146	646	143	1046	213109	191797.9
115	0.4	74	41	68	10	37	1305	1174.5
1848	0.7	674	1174	623	170	1055	252569	227312.1
161	0.4	95	66	88	12	61	3258.5	2932.677
41	0.7	12	29	11	3	27	6698.4	6028.56
315	0.4	190	125	171	31	113	5423.8	4881.456
45	1	0	45	0	5	40	9196.5	8276.85
302	0.4	200	102	186	24	92	5628.3	5065.425
11	0.4	67	-56	61	10	-60	4103	3692.7
511	0.7	241	270	221	68	222	63632	57269.02

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 999 7223	92	107	235	140.94	82	34
5935 01 006 8183	96	6	500	17.8	7	0
5935 01 006 8212	96	382	500	12.35	239	0
5935 01 008 2898	90	1299	3899	0.14	4392	386
5935 01 011 7666	96	7	500	13.48	3	0
5935 01 016 3813	96	69	500	21.55	5	10
5935 01 017 3697	87	285	100	135.22	497	127
5935 01 025 9086	96	367	1070	26.12	109	9
5935 01 029 2518	95	4	100	14.28	12	0
5935 01 030 6991	95	4	100	14.74	0	0
5935 01 037 6493	96	51	500	6.9	26	0
5935 01 038 6473	95	7	100	18.44	4	0
5935 01 044 4436	90	910	730	1.09	1189	0
5935 01 044 8588	90	172	506	0.55	132	0
5935 01 045 2926	90	400	876	0.26	429	0
5935 01 045 4830	90	172	323	0.39	136	0
5935 01 064 4721	95	114	100	20.91	21	0
5935 01 065 8357	95	3	100	25.94	0	0
5935 01 072 3866	90	157	929	0.21	1086	0
5935 01 074 8607	96	39	500	8.7	49	1
5935 01 077 7173	96	5	500	22.13	5	0
5935 01 079 7333	95	16	100	35.2	3	0
5935 01 079 7383	95	2	100	59.55	7	0
5935 01 079 8948	96	229	500	11.08	287	39
5935 01 081 3860	96	23	500	7.37	33	0
5935 01 082 8806	96	19	500	7.37	37	0
5935 01 084 5790	96	12	500	4.02	5	0
5935 01 086 6228	96	13	500	7.4	1	0
5935 01 086 8444	96	27	500	9.48	30	0
5935 01 089 1419	96	16	500	6.9	12	0
5935 01 089 1420	96	49	500	16.93	48	4
5935 01 091 1846	95	0	100	34.88	100	118
5935 01 094 3684	95	3	100	82.21	6	0
5935 01 103 4797	95	0	100	16.45	0	0
5935 01 105 7922	96	29	500	11.65	0	0
5935 01 112 5449	95	5	100	17.57	0	0
5935 01 122 7526	96	21	500	20.55	139	2
5935 01 134 1247	95	6	100	119.81	1	0
5935 01 136 1973	96	6	500	14.63	0	0
5935 01 147 9432	95	4	100	87.75	3	0
5935 01 157 9555	95	48	100	120.7	22	1
5950 00 052 4343	94	1093	106	18.77	1229	54
5950 00 234 0545	97	4	176	4.85	0	0
5950 00 443 9516	97	6	35	24.25	4	6

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
294	0.7	103	191	95	24	175	33121	29808.81
499	0.3	354	145	319	50	130	8900	8010
643	0.3	617	26	582	50	11	6175	5557.5
1192	0.9	520	672	481	390	321	545.86	491.274
504	0.3	355	149	320	50	134	6740	6066
574	0.3	398	176	363	50	161	10775	9697.5
15	1	0	15	0	10	5	13522	12169.8
1337	0.3	1006	331	931	107	299	27948	25153.56
92	0.4	62	30	56	10	26	1428	1285.2
104	0.4	62	42	56	10	38	1474	1326.6
525	0.3	386	139	351	50	124	3450	3105
103	0.4	64	39	58	10	35	1844	1659.6
451	0.9	164	287	157	73	221	795.7	716.13
546	0.9	68	478	63	51	432	278.3	250.47
847	0.9	128	719	119	88	640	227.76	204.984
359	0.9	50	309	46	32	281	125.97	113.373
193	0.4	128	65	122	10	61	2091	1881.9
103	0.4	62	41	56	10	37	2594	2334.6
0	0.9	109	-109	99	93	-192	195.09	175.581
491	0.3	377	114	342	50	99	4350	3915
500	0.3	354	146	319	50	131	11065	9958.5
113	0.4	70	43	64	10	39	3520	3168
95	0.4	61	34	55	10	30	5955	5359.5
481	0.3	510	-29	475	50	-44	5540	4986
490	0.3	366	124	331	50	109	3685	3316.5
482	0.3	363	119	328	50	104	3685	3316.5
507	0.3	358	149	323	50	134	2010	1809
512	0.3	359	153	324	50	138	3700	3330
497	0.3	369	128	334	50	113	4740	4266
504	0.3	361	143	326	50	128	3450	3105
505	0.3	384	121	349	50	106	8465	7618.5
118	0.4	60	58	54	10	54	3488	3139.2
97	0.4	62	35	56	10	31	8221	7398.9
100	0.4	60	40	54	10	36	1645	1480.5
529	0.3	370	159	335	50	144	5825	5242.5
105	0.4	63	42	57	10	38	1757	1581.3
384	0.3	365	19	330	50	4	10275	9247.5
105	0.4	64	41	58	10	37	11981	10782.9
506	0.3	354	152	319	50	137	7315	6583.5
101	0.4	62	39	56	10	35	8775	7897.5
127	0.4	89	38	83	10	34	12070	10863
24	0.5	600	-576	594	11	-581	1989.6	1790.658
180	0.2	144	36	130	18	32	853.6	768.24
43	0.2	33	10	30	4	9	848.75	763.875

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5950 00 462 1773	94	5	44	495.56	5	4
5950 00 624 1989	95	849	7312	9.71	1297	368
5950 00 624 1990	95	3622	16417	7.87	6447	699
5950 00 780 7417	95	6	53	223.6	0	1
5950 00 983 7611	95	8	65	247.52	9	0

Dec 89 Bal	S/L Fac	Exp Dec89 O/H	Sht Lng	Exp Dec89 @.9	Red LOT Qty	.9 LT Sht Lng	(.1) RedLOT Value	.1 Red Extend Value
48	0.3	34	14	32	4	12	21805	19624.18
7252	0.4	4897	2355	4458	731	2063	71000	63899.57
14291	0.4	12023	2268	11038	1642	1611	129202	116281.6
60	0.4	35	25	32	5	23	11851	10665.72
64	0.4	44	20	40	7	17	16089	14479.92

Saved $ 636,559.00

Appendix B: Diminished Manufacturing Source Life-of-Type Spreadsheet For 67% Buy

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 007 3962	94	4	5	651.89	0	0
5925 00 051 4889	94	42	20	113.95	4	0
5925 00 051 4892	94	262	20	319.28	46	12
5925 00 052 1743	94	10	10	213.95	7	1
5925 00 054 0100	94	21	40	193.6	20	2
5925 00 055 9360	94	15	50	374.12	12	5
5925 00 055 9371	94	17	54	61.48	43	1
5925 00 055 9373	94	13	10	319.2	11	3
5925 00 055 9374	94	4	5	436.77	8	0
5925 00 062 3354	97	5	4	377.5	6	2
5925 00 067 3359	94	7	10	649.22	1	1
5925 00 069 5343	94	15	15	231.38	3	5
5925 00 081 7593	94	12	50	559.58	5	6
5925 00 088 9602	94	53	135	171.22	59	7
5925 00 161 9147	94	15	25	559.58	19	1
5925 00 163 3658	94	7	8	60.95	2	0
5925 00 165 8539	94	7	5	232.72	0	1
5925 00 201 2244	93	6	34	49.11	12	0
5925 00 236 5094	94	5	5	651.89	0	0
5925 00 253 5137	94	26	50	200.23	21	13
5925 00 256 1218	94	6	55	355.01	12	7
5925 00 361 8836	94	8	5	436.77	0	0
5925 00 404 7431	94	13	154	500.02	24	0
5925 00 406 6398	94	0	7	20.45	1	0
5925 00 455 8584	94	2	25	193.6	6	0
5925 00 456 0651	94	18	40	92.75	10	8
5925 00 477 9644	94	35	40	193.6	15	13
5925 00 489 1537	94	60	45	202.82	49	10
5925 00 502 0979	94	49	55	193.6	0	11
5925 00 502 1947	94	16	5	210.45	9	0
5925 00 521 8208	94	88	45	202.82	132	0
5925 00 612 7159	94	10	39	172.25	7	3
5925 00 627 0974	94	22	135	525.2	12	9
5925 00 628 7795	88	1	90	120.89	95	38
5925 00 655 1229	94	0	6	610.14	8	3
5925 00 677 6593	94	46	70	186.22	21	4
5925 00 690 1728	94	7	14	60.95	1	1
5925 00 691 0019	94	41	155	474.04	39	0
5925 00 703 3589	94	192	516	27.85	559	292
5925 00 704 2295	94	0	131	356.71	12	47
5925 00 723 4910	94	35	70	212.5	28	11
5925 00 723 4912	94	17	30	223.12	13	5
5925 00 758 7955	94	14	10	434.09	6	7

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
9	0.5	5	4	3	2	4	3259.45	2183.832
58	0.5	31	27	28	7	23	2279	1526.93
248	0.5	141	107	138	7	103	6385.6	4278.352
14	0.5	10	4	8	3	3	2139.5	1433.465
43	0.5	31	12	23	13	7	7744	5188.48
58	0.5	33	25	24	17	17	18706	12533.02
29	0.5	36	-7	27	18	-16	3319.92	2224.346
15	0.5	12	3	10	3	2	3192	2138.64
1	0.5	5	-4	4	2	-5	2183.85	1463.179
5	0.2	7	-2	6	1	-2	1510	1011.7
17	0.5	9	8	7	3	7	6492.2	4349.774
32	0.5	15	17	13	5	14	3470.7	2325.369
63	0.5	31	32	23	17	23	27979	18745.93
136	0.5	94	42	72	45	19	23114.7	15486.85
22	0.5	20	2	16	8	-2	13989.5	9372.965
13	0.5	8	5	6	3	4	487.6	326.692
13	0.5	6	7	5	2	6	1163.6	779.612
28	0.6	16	12	12	11	5	1669.74	1118.726
10	0.5	5	5	4	2	4	3259.45	2183.832
68	0.5	38	30	30	17	21	10011.5	6707.705
56	0.5	31	25	21	18	17	19525.55	13082.12
13	0.5	7	6	6	2	5	2183.85	1463.179
143	0.5	84	59	58	51	34	77013.08	51592.06
6	0.5	4	2	2	2	2	143.15	95.9105
21	0.5	14	7	9	8	4	4840	3242.8
56	0.5	29	27	22	13	21	3710	2485.7
73	0.5	38	35	31	13	29	7744	5188.48
66	0.5	53	13	45	14	7	9126.9	6115.023
115	0.5	52	63	43	18	54	10648	7134.16
12	0.5	11	1	10	2	0	1052.25	705.0075
1	0.5	67	-66	59	15	-73	9126.9	6115.023
45	0.5	25	20	18	13	14	6717.75	4500.893
154	0.5	79	75	56	45	53	70902	47504.34
34	1	0	34	0	30	4	10880.1	7289.667
1	0.5	3	-2	2	2	-3	3660.84	2452.763
99	0.5	58	41	46	23	30	13035.4	8733.718
21	0.5	11	10	8	5	8	853.3	571.711
157	0.5	98	59	72	51	34	73476.2	49229.05
441	0.5	354	87	269	170	2	14370.6	9628.302
166	0.5	66	100	44	43	79	46729.01	31308.44
88	0.5	53	35	41	23	24	14875	9966.25
39	0.5	24	15	18	10	11	6693.6	4484.712
25	0.5	12	13	10	3	12	4340.9	2908.403

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 763 4103	94	8	10	215.02	6	2
5925 00 763 6985	94	5	25	186.59	8	7
5925 00 782 0113	94	489	600	135.51	1009	52
5925 00 785 7882	94	0	33	32.95	28	0
5925 00 809 5627	94	220	61	223.12	280	0
5925 00 816 5263	94	19	5	464.43	0	0
5925 00 821 8602	94	136	90	191.79	0	0
5925 00 826 8813	94	23	20	209.45	26	0
5925 00 828 9725	94	0	5	651.89	0	0
5925 00 835 2059	94	38	55	563.9	14	0
5925 00 837 6203	94	5	10	222.5	0	0
5925 00 837 6637	94	18	10	649.22	1	0
5925 00 838 2648	94	12	50	70.87	10	0
5925 00 839 3889	94	0	23	174.78	3	0
5925 00 848 7917	95	130	100	495.65	230	3
5925 00 849 2763	94	144	1127	353.11	578	48
5925 00 849 2765	94	12	20	162.5	9	0
5925 00 849 2766	94	4	5	651.89	0	0
5925 00 849 2767	94	3	23	60.95	0	0
5925 00 850 8145	94	70	5	70.87	9	0
5925 00 850 8146	94	80	35	193.6	8	4
5925 00 853 1995	94	40	15	221.97	0	4
5925 00 877 8066	94	15	89	60.95	33	16
5925 00 879 0971	94	0	337	110.4	438	165
5925 00 879 5108	94	45	40	569.22	6	4
5925 00 883 7656	94	34	40	60.38	12	0
5925 00 883 7657	94	11	55	193.6	7	0
5925 00 883 7660	94	22	5	60.95	16	2
5925 00 883 7670	94	23	28	60.95	7	3
5925 00 883 7673	94	8	5	70.87	0	0
5925 00 892 9932	94	14	30	379.86	17	0
5925 00 897 0644	94	62	195	169.62	51	11
5925 00 900 5934	94	0	100	20.41	77	0
5925 00 903 1640	94	5	5	225.18	0	0
5925 00 916 0367	94	6	20	177.55	1	0
5925 00 920 6437	94	7	20	230.31	32	7
5925 00 923 4152	94	0	8	604.25	8	0
5925 00 925 7840	94	5	30	559.58	3	0
5925 00 929 7272	94	1	5	225.18	3	2
5925 00 931 0315	94	6	20	403.2	2	3
5925 00 934 2842	94	1	15	689.56	18	2
5925 00 940 3003	94	68	85	202.82	39	10
5925 00 945 3426	94	13	5	651.89	0	0

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
14	0.5	9	5	7	3	4	2150.2	1440.634
29	0.5	15	14	11	8	10	4664.75	3125.383
132	0.5	545	-413	446	198	-512	81306	54475.02
5	0.5	17	-12	11	11	-17	1087.35	728.5245
1	0.5	141	-140	130	20	-149	13610.32	9118.914
24	0.5	12	12	11	2	11	2322.15	1555.841
226	0.5	113	113	98	30	98	17261.1	11564.94
17	0.5	22	-5	18	7	-8	4189	2806.63
5	0.5	3	2	2	2	1	3259.45	2183.832
79	0.5	47	32	37	18	24	31014.5	20779.72
15	0.5	8	7	6	3	6	2225	1490.75
27	0.5	14	13	12	3	12	6492.2	4349.774
52	0.5	31	21	23	17	12	3543.5	2374.145
36	0.5	12	24	8	8	20	4019.94	2693.36
3	0.4	138	-135	118	33	-148	49565	33208.55
741	0.5	636	105	450	372	-81	397955	266629.8
23	0.5	16	7	13	7	3	3250	2177.5
9	0.5	5	4	4	2	3	3259.45	2183.832
26	0.5	13	13	9	8	9	1401.85	939.2395
66	0.5	38	28	37	2	27	354.35	237.4145
111	0.5	58	53	52	12	47	6776	4539.92
59	0.5	28	31	25	5	29	3329.55	2230.799
87	0.5	52	35	37	29	21	5424.55	3634.449
64	0.5	169	-105	113	111	-160	37204.8	24927.22
83	0.5	43	40	36	13	34	22768.8	15255.1
62	0.5	37	25	30	13	19	2415.2	1618.184
59	0.5	33	26	24	18	17	10648	7134.16
13	0.5	14	-1	13	2	-2	304.75	204.1825
47	0.5	26	21	21	9	17	1706.6	1143.422
13	0.5	7	6	6	2	5	354.35	237.4145
27	0.5	22	5	17	10	0	11395.8	7635.186
217	0.5	129	88	96	64	57	33075.9	22160.85
23	0.5	50	-27	34	33	-44	2041	1367.47
10	0.5	5	5	4	2	4	1125.9	754.353
25	0.5	13	12	10	7	8	3551	2379.17
2	0.5	14	-12	10	7	-15	4606.2	3086.154
0	0.5	4	-4	3	3	-6	4834	3238.78
32	0.5	18	14	13	10	9	16787.4	11247.56
5	0.5	3	2	2	2	1	1125.9	754.353
27	0.5	13	14	10	7	10	8064	5402.88
0	0.5	8	-8	6	5	-11	10343.4	6930.078
124	0.5	77	47	62	28	34	17239.7	11550.6
18	0.5	9	9	8	2	8	3259.45	2183.832

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 946 7775	94	32	45	187.14	36	7
5925 00 950 2467	94	6	18	177.55	5	0
5925 00 964 3981	94	75	155	499.29	42	20
5925 00 981 2150	94	18	3	112.5	10	2
5925 00 985 0908	94	9	30	606.14	0	3
5925 00 990 2739	94	0	8	167.5	0	0
5925 01 004 2475	94	9	15	226.25	2	0
5925 01 023 5398	94	6	5	225.18	0	0
5925 01 032 1122	94	225	18	138.63	253	27
5925 01 093 4379	95	23	2	207.46	16	1
5925 01 130 5343	94	0	45	180.94	59	17
5925 01 159 7595	94	43	100	169.75	74	3
5935 00 014 6472	95	21	189	51.65	71	1
5935 00 054 6559	95	574	371	27.8	439	78
5935 00 055 7939	95	43	117	23.82	7	0
5935 00 056 9694	95	0	3	8.53	2	0
5935 00 057 0308	95	8	257	82.25	0	4
5935 00 057 5830	95	45	50	156.78	28	20
5935 00 062 1142	95	39	79	35.95	23	1
5935 00 065 9803	97	0	29	14.84	9	17
5935 00 067 4688	92	217	392	140.41	187	46
5935 00 067 4695	92	63	296	152.51	73	40
5935 00 069 5500	95	10	108	31.57	13	3
5935 00 069 5502	95	20	100	23.79	26	0
5935 00 069 5510	95	14	153	24.84	17	5
5935 00 078 9337	95	19	222	96.27	26	1
5935 00 080 7586	95	0	156	9.44	189	33
5935 00 081 7211	92	145	100	112.01	181	12
5935 00 083 5050	92	243	813	59.1	474	121
5935 00 087 8550	95	0	73	18.57	4	0
5935 00 087 8552	95	35	121	18.16	16	0
5935 00 088 8108	95	61	100	40.32	24	0
5935 00 088 8650	95	80	170	33.99	64	15
5935 00 089 2893	95	93	311	31.9	42	1
5935 00 089 6611	95	12	225	28.67	23	8
5935 00 089 6978	95	118	100	33.27	2	5
5935 00 089 8868	96	453	500	21.1	358	978
5935 00 103 7374	87	204	50	244.82	264	31
5935 00 106 6100	93	107	110	2.54	102	0
5935 00 119 3192	92	8	10	307.4	8	2
5935 00 119 3201	92	28	10	310.55	11	23
5935 00 138 1454	96	15	500	22.4	90	11
5935 00 160 3332	96	64	500	27.9	49	3

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
48	0.5	39	9	31	15	2	8421.3	5642.271
19	0.5	12	7	9	6	4	3195.9	2141.253
208	0.5	115	93	89	51	68	77389.95	51851.27
13	0.5	11	2	10	1	2	337.5	226.125
42	0.5	20	22	15	10	17	18184.2	12183.41
8	0.5	4	4	3	3	2	1340	897.8
22	0.5	12	10	10	5	7	3393.75	2273.813
11	0.5	6	5	5	2	4	1125.9	754.353
17	0.5	122	-105	119	6	-108	2495.34	1671.878
10	0.4	15	-5	15	1	-6	414.92	277.9964
3	0.5	23	-20	15	15	-27	8142.3	5455.341
72	0.5	72	0	55	33	-16	16975	11373.25
140	0.4	126	14	89	62	-11	9761.85	6540.44
584	0.4	567	17	494	122	-32	10313.8	6910.246
153	0.4	96	57	73	39	41	2786.94	1867.25
1	0.6	2	-1	1	1	-1	25.59	17.1453
269	0.4	159	110	108	85	76	21138.25	14162.63
87	0.4	57	30	47	17	23	7839	5252.13
96	0.4	71	25	55	26	15	2840.05	1902.834
37	0.2	23	14	16	10	11	430.36	288.3412
468	0.7	183	285	144	129	195	55040.72	36877.28
326	0.7	108	218	78	98	150	45142.96	30245.78
108	0.4	71	37	49	36	23	3409.56	2284.405
94	0.4	72	22	52	33	9	2379	1593.93
155	0.4	100	55	70	50	35	3800.52	2546.348
216	0.4	145	71	101	73	42	21371.94	14319.2
0	0.4	94	-94	63	51	-114	1472.64	986.6688
76	0.7	4	72	64	33	-21	11201	7504.67
703	0.7	317	386	236	268	199	48048.3	32192.36
69	0.4	44	25	29	24	16	1355.61	908.2587
140	0.4	94	46	70	40	30	2197.36	1472.231
137	0.4	97	40	77	33	27	4032	2701.44
201	0.4	150	51	116	56	29	5778.3	3871.461
363	0.4	242	121	181	103	79	9920.9	6647.003
222	0.4	142	80	98	74	50	6450.75	4322.003
221	0.4	131	90	111	33	77	3327	2229.09
1573	0.3	667	906	552	165	856	10550	7068.5
21	1	0	21	0	17	4	12241	8201.47
115	0.6	87	28	72	36	7	279.4	187.198
12	0.7	5	7	4	3	5	3074	2059.58
50	0.7	11	39	10	3	37	3105.5	2080.685
436	0.3	361	75	245	165	26	11200	7504
518	0.3	395	123	279	165	74	13950	9346.5

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 163 3334	96	146	500	62.1	38	8
5935 00 173 7277	87	716	275	71.49	955	37
5935 00 184 7368	92	29	111	183.57	74	42
5935 00 189 6245	93	1427	10838	1.43	3734	1096
5935 00 227 7094	92	82	250	160.87	80	16
5935 00 235 8525	87	275	25	160.96	323	35
5935 00 250 0905	87	30	118	113.5	166	136
5935 00 259 3318	93	430	1921	1.99	1747	115
5935 00 259 6044	87	97	200	15.78	268	76
5935 00 274 1986	96	0	172	42.05	2	5
5935 00 328 3755	95	25	500	9.31	129	40
5935 00 333 7508	96	14	100	333.22	27	0
5935 00 365 9400	95	7	100	118.88	15	0
5935 00 396 6852	95	45	244	15.89	24	0
5935 00 412 1219	93	5	50	2.18	22	0
5935 00 439 0551	92	30	96	170	13	6
5935 00 450 5139	96	0	485	20.1	35	2
5935 00 455 4678	92	29	55	206.77	23	19
5935 00 455 9595	95	2	100	22.15	0	0
5935 00 472 0288	92	3	50	15.04	36	0
5935 00 476 6315	92	76	775	2.08	111	0
5935 00 487 5789	96	69	174	210	154	11
5935 00 497 5688	95	40	500	12.77	93	6
5935 00 497 9198	92	196	617	9.53	175	209
5935 00 497 9200	92	108	1000	3.31	300	7
5935 00 497 9202	92	479	1436	2.12	253	39
5935 00 497 9203	92	1628	6411	2.17	4033	242
5935 00 497 9204	92	324	1093	1.92	272	5
5935 00 498 5639	92	148	1849	8.86	168	35
5935 00 498 5641	92	156	344	5.48	285	0
5935 00 498 5642	92	196	365	3.03	424	124
5935 00 501 0948	96	30	500	15.53	24	5
5935 00 503 9885	96	31	500	22.35	15	0
5935 00 520 5235	93	12	10	6.45	1	0
5935 00 523 9462	87	313	250	67.31	416	1
5935 00 557 2514	89	9	613	147.54	20	5
5935 00 578 9329	93	863	10	37.49	335	78
5935 00 603 7706	93	35	110	23.1	39	2
5935 00 603 7707	93	138	262	10.93	157	9
5935 00 605 6714	96	10	500	18.28	4	0
5935 00 615 3637	95	17	100	22.62	17	9
5935 00 628 6513	96	27	103	95.1	39	3
5935 00 631 4156	97	17	98	1021.6	56	14

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
616	0.3	452	164	337	165	114	31050	20803.5
73	1	0	73	0	91	-18	19659.75	13172.03
108	0.7	42	66	31	37	40	20376.27	13652.1
9627	0.6	4906	4721	3475	3576	2576	15498.34	10383.89
268	0.7	100	168	75	83	110	40217.5	26945.73
12	1	0	12	0	8	4	4024	2696.08
118	1	0	118	0	39	79	13393	8973.31
719	0.6	940	-221	687	634	-602	3822.79	2561.269
105	1	0	105	0	66	39	3156	2114.52
175	0.3	120	55	81	57	37	7232.6	4845.842
436	0.4	315	121	216	165	55	4655	3118.85
87	0.3	80	7	57	33	-3	33322	22325.74
92	0.4	64	28	44	33	15	11888	7964.96
265	0.4	173	92	125	81	59	3877.16	2597.697
33	0.6	22	11	15	17	1	109	73.03
119	0.7	38	81	28	32	59	16320	10934.4
452	0.3	340	112	227	160	65	9748.5	6531.495
80	0.7	25	55	20	18	42	11372.35	7619.475
102	0.4	61	41	41	33	28	2215	1484.05
17	0.7	16	1	11	17	-11	752	503.84
740	0.7	255	485	179	256	305	1612	1080.04
100	0.3	170	-70	130	57	-87	36540	24481.8
453	0.4	324	129	225	165	63	6385	4277.95
847	0.7	244	603	183	204	460	5880.01	3939.607
815	0.7	332	483	233	330	252	3310	2217.7
1701	0.7	575	1126	432	474	795	3044.32	2039.694
4248	0.7	2412	1836	1777	2116	355	13911.87	9320.953
1150	0.7	425	725	317	361	472	2098.56	1406.035
1864	0.7	599	1265	416	610	838	16382.14	10976.03
215	0.7	150	65	116	114	-15	1885.12	1263.03
261	0.7	168	93	132	120	9	1105.95	740.9865
511	0.3	371	140	256	165	90	7765	5202.55
516	0.3	372	144	256	165	95	11175	7487.25
21	0.6	9	12	7	3	11	64.5	43.215
148	1	0	148	0	83	65	16827.5	11274.43
607	1	0	607	0	202	405	90442.02	60596.15
616	0.6	349	267	348	3	265	374.9	251.183
108	0.6	58	50	43	36	29	2541	1702.47
252	0.6	160	92	125	86	41	2863.66	1918.652
506	0.3	357	149	242	165	99	9140	6123.8
109	0.4	70	39	50	33	26	2262	1515.54
94	0.3	91	3	67	34	-7	9795.3	6562.851
73	0.2	92	-19	66	32	-25	100113.9	67076.29

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 660 5590	93	630	4110	2.34	1998	490
5935 00 660 5846	92	1547	2809	68.36	2542	378
5935 00 660 5854	93	0	15	5.05	12	2
5935 00 660 5855	92	722	1402	81.11	1245	281
5935 00 670 0033	95	231	1104	35.07	334	29
5935 00 679 0479	93	0	63	1.72	6	0
5935 00 683 1402	93	227	210	5.25	389	30
5935 00 683 2312	92	11	9	158.77	19	13
5935 00 683 5102	95	0	100	26.5	56	0
5935 00 687 1122	95	138	357	90.02	274	11
5935 00 689 4662	92	1	50	215.05	26	25
5935 00 704 6020	87	41	35	277.47	16	0
5935 00 705 9887	95	1	100	34.84	19	0
5935 00 726 4204	92	51	240	181.97	288	45
5935 00 730 4145	95	7	113	18.04	9	0
5935 00 755 6213	95	182	316	42.28	288	8
5935 00 761 3235	95	0	100	74.13	97	2
5935 00 761 4344	92	35	50	317.68	12	0
5935 00 767 5154	95	59	100	32.97	21	19
5935 00 769 5490	95	20	100	80.06	1	1
5935 00 781 3036	95	0	100	18.88	5	0
5935 00 787 3534	95	47	156	17.33	36	8
5935 00 791 5476	95	3	100	119.81	1	0
5935 00 799 3054	95	74	500	12.17	153	2
5935 00 804 2942	95	16	100	57.06	1	0
5935 00 804 2957	95	31	100	48.84	0	52
5935 00 805 3463	95	64	158	59.47	41	9
5935 00 805 3946	95	20	188	167.43	25	5
5935 00 805 4664	95	93	328	50.08	142	18
5935 00 806 7509	92	698	1400	78.81	1343	263
5935 00 807 9629	95	171	511	89.55	187	42
5935 00 811 8635	92	315	786	98.9	585	236
5935 00 812 2554	87	66	100	92.44	134	28
5935 00 813 0030	95	45	500	9.8	38	3
5935 00 814 5798	95	169	100	43.82	115	7
5935 00 814 5814	95	74	100	47.48	16	36
5935 00 814 5815	95	78	113	40.46	16	12
5935 00 820 9501	92	76	1100	55.02	346	56
5935 00 823 0295	95	192	323	32.47	144	30
5935 00 827 5022	96	0	500	18.96	613	127
5935 00 836 9653	95	14	100	34.72	0	0
5935 00 838 2762	87	338	57	196.56	273	122
5935 00 842 1374	95	7	100	28.1	1	0
5935 00 842 1376	95	72	100	72.56	3	2

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
3232	0.6	1896	1336	1353	1356	523	9617.4	6443.658
2192	0.7	1307	885	1029	927	236	192023.2	128655.6
5	0.6	6	-1	4	5	-4	75.75	50.7525
1160	0.7	637	523	498	463	199	113716.2	76189.87
1030	0.4	801	229	582	364	84	38717.28	25940.58
57	0.6	25	32	17	21	19	108.36	72.6012
78	0.6	175	-97	147	69	-138	1102.5	738.675
14	0.7	6	8	5	3	6	1428.93	957.3831
44	0.4	60	-16	40	33	-29	2650	1775.5
232	0.4	297	-65	226	118	-112	32137.14	21531.88
50	0.7	15	35	10	17	23	10752.5	7204.175
60	1	0	60	0	12	48	9711.45	6506.672
82	0.4	61	21	41	33	8	3484	2334.28
48	0.7	87	-39	64	79	-95	43672.8	29260.78
111	0.4	72	39	50	37	24	2038.52	1365.808
218	0.4	299	-81	236	104	-122	13360.48	8951.522
5	0.4	60	-55	40	33	-68	7413	4966.71
73	0.7	26	47	21	17	35	15884	10642.28
157	0.4	94	63	76	33	48	3297	2208.99
120	0.4	72	48	52	33	35	8006	5364.02
95	0.4	60	35	40	33	22	1888	1264.96
175	0.4	122	53	91	51	33	2703.48	1811.332
102	0.4	62	40	42	33	27	11981	8027.27
423	0.4	344	79	245	165	13	6085	4076.95
115	0.4	70	45	50	33	32	5706	3823.02
183	0.4	79	104	59	33	91	4884	3272.28
190	0.4	133	57	102	52	36	9396.26	6295.494
188	0.4	125	63	88	62	38	31476.84	21089.48
297	0.4	253	44	188	108	1	16426.24	11005.58
1018	0.7	629	389	491	462	65	110334	73923.78
537	0.4	409	128	308	169	60	45760.05	30659.23
752	0.7	330	422	252	259	241	77735.4	52082.72
60	1	0	60	0	33	27	9244	6193.48
510	0.4	327	183	228	165	117	4900	3283
161	0.4	161	0	142	33	-14	4382	2935.94
194	0.4	104	90	85	33	76	4748	3181.16
187	0.4	115	72	92	37	58	4571.98	3063.227
886	0.7	353	533	244	363	279	60522	40549.74
401	0.4	309	92	245	107	49	10487.81	7026.833
14	0.3	350	-336	235	165	-386	9480	6351.6
114	0.4	68	46	49	33	32	3472	2326.24
244	1	0	244	0	19	225	11203.92	7506.626
106	0.4	64	42	44	33	29	2810	1882.7
171	0.4	103	68	83	33	55	7256	4861.52

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 842 9045	87	409	176	139.63	411	156
5935 00 843 0144	87	25	25	424.61	24	3
5935 00 845 7508	95	120	300	32.34	35	0
5935 00 856 2872	95	2	100	40.86	4	11
5935 00 872 4730	97	13	240	88.47	34	5
5935 00 872 6853	87	47	25	76.52	41	3
5935 00 878 1603	96	0	500	11.9	280	0
5935 00 878 1604	96	0	100	44.76	36	75
5935 00 879 8440	92	80	410	254	215	28
5935 00 883 5868	92	15	30	143.12	10	1
5935 00 884 3427	96	34	2500	35.85	235	4
5935 00 886 9796	87	13	25	142.04	11	5
5935 00 888 3708	96	296	500	9.48	319	31
5935 00 897 4610	95	10	100	28.09	2	2
5935 00 900 0859	95	0	100	36.99	3	0
5935 00 900 1239	96	14	500	8.15	10	0
5935 00 900 1987	95	95	203	26.27	24	6
5935 00 900 1989	95	11	100	38.08	5	1
5935 00 900 1990	95	8	100	38.46	12	2
5935 00 900 1992	95	2	100	53.68	0	3
5935 00 900 1997	95	52	100	18.95	10	10
5935 00 900 2001	95	28	164	31.88	14	10
5935 00 900 2002	95	29	100	55.66	18	3
5935 00 900 2003	95	4	100	38.16	0	1
5935 00 900 2076	95	27	100	19.92	0	0
5935 00 901 5912	95	20	100	23.49	0	4
5935 00 905 6652	95	60	182	25.41	16	34
5935 00 905 9676	92	257	850	72.05	553	131
5935 00 910 9280	92	8	25	245.91	3	3
5935 00 911 9871	93	414	37	2.98	331	0
5935 00 912 1432	93	83	31	4.56	84	0
5935 00 912 1436	93	414	1010	1.39	306	0
5935 00 912 1498	93	219	515	1.81	176	0
5935 00 912 6393	95	43	100	40.57	67	10
5935 00 912 7813	95	25	100	26.71	38	5
5935 00 913 7613	92	9	25	324.74	10	6
5935 00 916 0413	95	115	251	27.4	100	18
5935 00 916 0514	92	29	16	298.99	36	20
5935 00 916 0641	92	40	10	396.23	0	7
5935 00 917 3325	95	4	100	59.15	0	4
5935 00 919 0562	96	206	500	31.6	174	14
5935 00 923 4874	92	7	25	284.49	29	8
5935 00 937 7371	93	8	50	6.17	5	0

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
330	1	0	330	0	58	272	24574.88	16465.17
29	1	0	29	0	8	21	10615.25	7112.218
385	0.4	252	133	193	99	93	9702	6500.34
109	0.4	61	48	41	33	35	4086	2737.62
224	0.2	202	22	139	79	6	21232.8	14225.98
34	1	0	34	0	8	26	1913	1281.71
220	0.3	350	-130	235	165	-180	5950	3986.5
139	0.3	70	69	47	33	59	4476	2998.92
303	0.7	147	156	106	135	62	104140	69773.8
36	0.7	14	22	11	10	15	4293.6	2876.712
2303	0.3	1774	529	1196	825	282	89625	60048.75
32	1	0	32	0	8	24	3551	2379.17
508	0.3	557	-49	442	165	-99	4740	3175.8
110	0.4	66	44	46	33	31	2809	1882.03
97	0.4	60	37	40	33	24	3699	2478.33
504	0.3	360	144	244	165	95	4075	2730.25
280	0.4	179	101	139	67	74	5332.81	3572.983
107	0.4	67	40	47	33	27	3808	2551.36
98	0.4	65	33	45	33	20	3846	2576.82
105	0.4	61	44	41	33	31	5368	3596.56
152	0.4	91	61	71	33	48	1895	1269.65
188	0.4	115	73	83	54	51	5228.32	3502.974
114	0.4	77	37	58	33	23	5566	3729.22
105	0.4	62	43	43	33	29	3816	2556.72
127	0.4	76	51	56	33	38	1992	1334.64
124	0.4	72	52	52	33	39	2349	1573.83
260	0.4	145	115	109	60	91	4624.62	3098.495
685	0.7	332	353	248	281	156	61242.5	41032.47
33	0.7	10	23	7	8	18	6147.75	4118.993
120	0.6	180	-60	176	12	-68	110.26	73.8742
30	0.6	46	-16	42	10	-22	141.36	94.7112
1118	0.6	570	548	436	333	349	1403.9	940.613
558	0.6	294	264	226	170	162	932.15	624.5405
86	0.4	86	0	66	33	-13	4057	2718.19
92	0.4	75	17	55	33	4	2671	1789.57
30	0.7	10	20	8	8	14	8118.5	5439.395
284	0.4	220	64	170	83	31	6877.4	4607.858
29	0.7	14	15	12	5	12	4783.84	3205.173
57	0.7	15	42	14	3	40	3962.3	2654.741
108	0.4	62	46	43	33	32	5915	3963.05
546	0.3	494	52	379	165	2	15800	10586
11	0.7	10	1	7	8	-4	7112.25	4765.208
53	0.6	23	30	17	17	19	308.5	206.695

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 938 7299	95	11	100	27.56	8	0
5935 00 946 1272	96	28	500	7.6	42	3
5935 00 947 2925	95	48	500	18.5	487	115
5935 00 951 2154	87	158	100	230.5	176	26
5935 00 952 2204	95	152	100	37.51	30	13
5935 00 954 3147	96	19	500	13	5	7
5935 00 954 7895	95	23	100	19.65	7	10
5935 00 954 7896	95	5	100	29.84	9	0
5935 00 954 9050	95	37	196	21.81	154	44
5935 00 954 9064	95	18	100	22.14	3	5
5935 00 954 9072	95	53	254	28.44	87	11
5935 00 954 9076	95	45	100	25.16	26	7
5935 00 956 4983	92	20	40	176.44	1	11
5935 00 956 8340	99	28	144	95.54	30	22
5935 00 956 8341	99	63	113	81.6	63	15
5935 00 957 8473	95	109	100	20.75	45	10
5935 00 957 8480	95	72	100	31.64	14	9
5935 00 958 7507	95	182	622	43.39	120	61
5935 00 959 8561	95	36	100	56.12	22	8
5935 00 962 0221	96	26	500	15.9	2	3
5935 00 967 1272	92	224	350	194.34	34	82
5935 00 967 1273	88	751	800	154.27	473	39
5935 00 967 1279	87	481	108	181.58	78	14
5935 00 967 1288	92	52	1325	18.03	123	30
5935 00 967 1291	92	85	500	174.38	80	22
5935 00 967 1295	92	166	550	186.19	123	48
5935 00 967 1308	92	84	250	309.85	165	26
5935 00 967 1310	92	54	400	349.77	84	7
5935 00 967 1311	87	41	375	346.86	88	0
5935 00 968 6929	87	212	145	3.01	182	54
5935 00 972 3151	92	315	2000	76.27	1169	201
5935 00 974 5683	92	1039	350	5.76	1011	0
5935 00 974 5684	92	99	1625	136.52	380	47
5935 00 974 5685	92	871	1425	149.55	494	33
5935 00 974 6929	95	23	100	13.05	8	0
5935 00 976 0023	92	546	1700	148.57	443	45
5935 00 976 4811	95	38	121	26.93	10	12
5935 00 977 5821	92	11	30	223.28	2	2
5935 00 983 5978	95	5	311	17.44	3	2
5935 00 983 8873	87	25	50	183.93	40	10
5935 00 988 5945	95	99	235	23.95	49	17
5935 00 989 0900	95	12	100	41.03	110	9
5935 00 989 5998	92	128	675	94.27	398	106

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
103	0.4	67	36	47	33	23	2756	1846.52
489	0.3	370	119	254	165	70	3800	2546
176	0.4	329	-153	230	165	-219	9250	6197.5
108	1	0	108	0	33	75	23050	15443.5
235	0.4	151	84	131	33	71	3751	2513.17
521	0.3	363	158	248	165	108	6500	4355
126	0.4	74	52	54	33	39	1965	1316.55
96	0.4	63	33	43	33	20	2984	1999.28
123	0.4	140	-17	101	65	-43	4274.76	2864.089
120	0.4	71	49	51	33	36	2214	1483.38
231	0.4	184	47	134	84	13	7223.76	4839.919
126	0.4	87	39	67	33	26	2516	1685.72
70	0.7	18	52	14	13	43	7057.6	4728.592
164	0.3	120	44	87	48	29	13757.76	9217.699
128	0.3	123	5	97	37	-6	9220.8	6177.936
174	0.4	125	49	106	33	35	2075	1390.25
167	0.4	103	64	83	33	51	3164	2119.88
745	0.4	482	263	359	205	181	26988.58	18082.35
122	0.4	82	40	62	33	27	5612	3760.04
527	0.4	316	211	217	165	145	7950	5326.5
622	0.7	172	450	138	116	368	68019	45572.73
1117	1	0	1117	0	264	853	123416	82688.72
525	1	0	525	0	36	489	19610.64	13139.13
1284	0.7	413	871	282	437	565	23889.75	16006.13
527	0.7	176	351	126	165	236	87190	58417.3
641	0.7	215	426	160	182	299	102404.5	68611.01
195	0.7	100	95	75	83	37	77462.5	51899.88
377	0.7	136	241	97	132	148	139908	93738.36
328	1	0	328	0	124	204	130072.5	87148.58
229	1	0	229	0	48	181	436.45	292.4215
1347	0.7	695	652	497	660	190	152540	102201.8
378	0.7	417	-39	382	116	-120	2016	1350.72
1391	0.7	517	874	356	536	499	221845	148636.2
1835	0.7	689	1146	548	470	817	213108.8	142782.9
115	0.4	74	41	54	33	28	1305	874.35
1848	0.7	674	1174	506	561	781	252569	169221.2
161	0.4	95	66	71	40	50	3258.53	2183.215
41	0.7	12	29	9	10	22	6698.4	4487.928
315	0.4	190	125	128	103	84	5423.84	3633.973
45	1	0	45	0	17	28	9196.5	6161.655
302	0.4	200	102	154	78	70	5628.25	3770.928
11	0.4	67	-56	47	33	-69	4103	2749.01
511	0.7	241	270	174	223	114	63632.25	42633.61

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 999 7223	92	107	235	140.94	82	34
5935 01 006 8183	96	6	500	17.8	7	0
5935 01 006 8212	96	382	500	12.35	239	0
5935 01 008 2898	90	1299	3899	0.14	4392	386
5935 01 011 7666	96	7	500	13.48	3	0
5935 01 016 3813	96	69	500	21.55	5	10
5935 01 017 3697	87	285	100	135.22	497	127
5935 01 025 9086	96	367	1070	26.12	109	9
5935 01 029 2518	95	4	100	14.28	12	0
5935 01 030 6991	95	4	100	14.74	0	0
5935 01 037 6493	96	51	500	6.9	26	0
5935 01 038 6473	95	7	100	18.44	4	0
5935 01 044 4436	90	910	730	1.09	1189	0
5935 01 044 8588	90	172	506	0.55	132	0
5935 01 045 2926	90	400	876	0.26	429	0
5935 01 045 4830	90	172	323	0.39	136	0
5935 01 064 4721	95	114	100	20.91	21	0
5935 01 065 8357	95	3	100	25.94	0	0
5935 01 072 3866	90	157	929	0.21	1086	0
5935 01 074 8607	96	39	500	8.7	49	1
5935 01 077 7173	96	5	500	22.13	5	0
5935 01 079 7333	95	16	100	35.2	3	0
5935 01 079 7383	95	2	100	59.55	7	0
5935 01 079 8948	96	229	500	11.08	287	39
5935 01 081 3860	96	23	500	7.37	33	0
5935 01 082 8806	96	19	500	7.37	37	0
5935 01 084 5790	96	12	500	4.02	5	0
5935 01 086 6228	96	13	500	7.4	1	0
5935 01 086 8444	96	27	500	9.48	30	0
5935 01 089 1419	96	16	500	6.9	12	0
5935 01 089 1420	96	49	500	16.93	48	4
5935 01 091 1846	95	0	100	34.88	100	118
5935 01 094 3684	95	3	100	82.21	6	0
5935 01 103 4797	95	0	100	16.45	0	0
5935 01 105 7922	96	29	500	11.65	0	0
5935 01 112 5449	95	5	100	17.57	0	0
5935 01 122 7526	96	21	500	20.55	139	2
5935 01 134 1247	95	6	100	119.81	1	0
5935 01 136 1973	96	6	500	14.63	0	0
5935 01 147 9432	95	4	100	87.75	3	0
5935 01 157 9555	95	48	100	120.7	22	1
5950 00 052 4343	94	1093	106	18.77	1229	54
5950 00 234 0545	97	4	176	4.85	0	0
5950 00 443 9516	97	6	35	24.25	4	6

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
294	0.7	103	191	79	78	137	33120.9	22191
499	0.3	354	145	239	165	95	8900	5963
643	0.3	617	26	502	165	-24	6175	4137.25
1192	0.9	520	672	391	1287	-486	545.86	365.7262
504	0.3	355	149	239	165	100	6740	4515.8
574	0.3	398	176	283	165	126	10775	7219.25
15	1	0	15	0	33	-18	13522	9059.74
1337	0.3	1006	331	759	353	225	27948.4	18725.43
92	0.4	62	30	43	33	16	1428	956.76
104	0.4	62	42	43	33	28	1474	987.58
525	0.3	386	139	270	165	90	3450	2311.5
103	0.4	64	39	44	33	26	1844	1235.48
451	0.9	164	287	140	241	70	795.7	533.119
546	0.9	68	478	51	167	328	278.3	186.461
847	0.9	128	719	99	289	459	227.76	152.5992
359	0.9	50	309	39	107	213	125.97	84.3999
193	0.4	128	65	109	33	51	2091	1400.97
103	0.4	62	41	42	33	28	2594	1737.98
0	0.9	109	-109	78	307	-385	195.09	130.7103
491	0.3	377	114	262	165	64	4350	2914.5
500	0.3	354	146	238	165	97	11065	7413.55
113	0.4	70	43	50	33	30	3520	2358.4
95	0.4	61	34	41	33	21	5955	3989.85
481	0.3	510	-29	395	165	-79	5540	3711.8
490	0.3	366	124	251	165	74	3685	2468.95
482	0.3	363	119	248	165	69	3685	2468.95
507	0.3	358	149	243	165	99	2010	1346.7
512	0.3	359	153	244	165	103	3700	2479
497	0.3	369	128	253	165	79	4740	3175.8
504	0.3	361	143	246	165	93	3450	2311.5
505	0.3	384	121	269	165	71	8465	5671.55
118	0.4	60	58	40	33	45	3488	2336.96
97	0.4	62	35	42	33	22	8221	5508.07
100	0.4	60	40	40	33	27	1645	1102.15
529	0.3	370	159	255	165	109	5825	3902.75
105	0.4	63	42	43	33	29	1757	1177.19
384	0.3	365	19	249	165	-30	10275	6884.25
105	0.4	64	41	44	33	28	11981	8027.27
506	0.3	354	152	239	165	102	7315	4901.05
101	0.4	62	39	43	33	25	8775	5879.25
127	0.4	89	38	69	33	25	12070	8086.9
24	0.5	600	-576	582	35	-593	1989.62	1333.045
180	0.2	144	36	98	58	24	853.6	571.912
43	0.2	33	10	24	12	7	848.75	568.6625

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5950 00 462 1773	94	5	44	495.56	5	4
5950 00 624 1989	95	849	7312	9.71	1297	388
5950 00 624 1990	95	3622	16417	7.87	6447	699
5950 00 780 7417	95	6	53	223.6	0	1
5950 00 983 7611	95	8	65	247.52	9	0

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 @.67	Red LOT Qty	(.67) Sht Lng	.67 Red LOT Value	.67 Red Extend Value
48	0.3	34	14	24	15	9	21804.64	14609.11
7252	0.4	4897	2355	3449	2413	1390	70999.52	47569.68
14291	0.4	12023	2268	8773	5418	100	129201.8	86565.2
60	0.4	35	25	25	17	18	11850.8	7940.036
64	0.4	44	20	31	21	12	16088.8	10779.5

Savings 2,073,842.00

Appendix C: Diminished Manufacturing Source Life-of-Type Spreadsheet For 50% Buy

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 007 3962	94	4	5	651.89	0	0
5925 00 051 4889	94	42	20	113.95	4	0
5925 00 051 4892	94	262	20	319.28	46	12
5925 00 052 1743	94	10	10	213.95	7	1
5925 00 054 0100	94	21	40	193.6	20	2
5925 00 055 9360	94	15	50	374.12	12	5
5925 00 055 9371	94	17	54	61.48	43	1
5925 00 055 9373	94	13	10	319.2	11	3
5925 00 055 9374	94	4	5	436.77	8	0
5925 00 062 3354	97	5	4	377.5	6	2
5925 00 067 3359	94	7	10	649.22	1	1
5925 00 069 5343	94	15	15	231.38	3	5
5925 00 081 7593	94	12	50	559.58	5	6
5925 00 088 9602	94	53	135	171.22	59	7
5925 00 161 9147	94	15	25	559.58	19	1
5925 00 163 3658	94	7	8	60.95	2	0
5925 00 165 8539	94	7	5	232.72	0	1
5925 00 201 2244	93	6	34	49.11	12	0
5925 00 236 5094	94	5	5	651.89	0	0
5925 00 253 5137	94	26	50	200.23	21	13
5925 00 256 1218	94	6	55	355.01	12	7
5925 00 361 8836	94	8	5	436.77	0	0
5925 00 404 7431	94	13	154	500.02	24	0
5925 00 406 6398	94	0	7	20.45	1	0
5925 00 455 8584	94	2	25	193.6	6	0
5925 00 456 0651	94	18	40	92.75	10	8
5925 00 477 9644	94	35	40	193.6	15	13
5925 00 489 1537	94	60	45	202.82	49	10
5925 00 502 0979	94	49	55	193.6	0	11
5925 00 502 1947	94	16	5	210.45	9	0
5925 00 521 8208	94	88	45	202.82	132	0
5925 00 612 7159	94	10	39	172.25	7	3
5925 00 627 0974	94	22	135	525.2	12	9
5925 00 628 7795	88	1	90	120.89	95	38
5925 00 655 1229	94	0	6	610.14	8	3
5925 00 677 6593	94	46	70	186.22	21	4
5925 00 690 1728	94	7	14	60.95	1	1
5925 00 691 0019	94	41	155	474.04	39	0
5925 00 703 3589	94	192	516	27.85	559	292
5925 00 704 2295	94	0	131	356.71	12	47
5925 00 723 4910	94	35	70	212.5	28	11
5925 00 723 4912	94	17	30	223.12	13	5
5925 00 758 7955	94	14	10	434.09	6	7

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
9	0.5	5	4	3	3	3	3259.45	1629.725
58	0.5	31	27	26	10	22	2279	1139.5
248	0.5	141	107	136	10	102	6385.6	3192.8
14	0.5	10	4	8	5	2	2139.5	1069.75
43	0.5	31	12	21	20	2	7744	3872
58	0.5	33	25	20	25	13	18706	9353
29	0.5	36	-7	22	27	-20	3319.92	1659.96
15	0.5	12	3	9	5	1	3192	1596
1	0.5	5	-4	3	3	-5	2183.85	1091.925
5	0.2	7	-2	6	2	-3	1510	755
17	0.5	9	8	6	5	6	6492.2	3246.1
32	0.5	15	17	11	8	13	3470.7	1735.35
63	0.5	31	32	19	25	19	27979	13989.5
136	0.5	94	42	60	68	8	23114.7	11557.35
22	0.5	20	2	14	13	-5	13989.5	6994.75
13	0.5	8	5	6	4	3	487.6	243.8
13	0.5	6	7	5	3	5	1163.6	581.8
28	0.6	16	12	9	17	2	1669.74	834.87
10	0.5	5	5	4	3	3	3259.45	1629.725
68	0.5	38	30	26	25	17	10011.5	5005.75
56	0.5	31	25	17	28	11	19525.55	9762.775
13	0.5	7	6	5	3	5	2183.85	1091.925
143	0.5	84	59	45	77	21	77003.08	38501.54
6	0.5	4	2	2	4	0	143.15	71.575
21	0.5	14	7	7	13	1	4840	2420
56	0.5	29	27	19	20	17	3710	1855
73	0.5	38	35	28	20	25	7744	3872
66	0.5	53	13	41	23	2	9126.9	4563.45
115	0.5	52	63	38	28	49	10648	5324
12	0.5	11	1	9	3	0	1052.25	526.125
1	0.5	67	-66	55	23	-77	9126.9	4563.45
45	0.5	25	20	15	20	10	6717.75	3358.875
154	0.5	79	75	45	68	41	70902	35451
34	1	0	34	0	45	-11	10880.1	5440.05
1	0.5	3	-2	2	3	-4	3660.84	1830.42
99	0.5	58	41	41	35	23	13035.4	6517.7
21	0.5	11	10	7	7	7	853.3	426.65
157	0.5	98	59	59	78	20	73476.2	36738.1
441	0.5	354	87	225	258	-42	14370.6	7185.3
166	0.5	66	100	33	66	67	46729.01	23364.5
88	0.5	53	35	35	35	18	14875	7437.5
39	0.5	24	15	16	15	8	6693.6	3346.8
25	0.5	12	13	10	5	10	4340.9	2170.45

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 763 4103	94	8	10	215.02	6	2
5925 00 763 6985	94	5	25	186.59	8	7
5925 00 782 0113	94	489	600	135.51	1009	52
5925 00 785 7882	94	0	33	32.95	28	0
5925 00 809 5627	94	220	61	223.12	280	0
5925 00 816 5263	94	19	5	464.43	0	0
5925 00 821 8602	94	136	90	191.79	0	0
5925 00 826 8813	94	23	20	209.45	26	0
5925 00 828 9725	94	0	5	651.89	0	0
5925 00 835 2059	94	38	55	563.9	14	0
5925 00 837 6203	94	5	10	222.5	0	0
5925 00 837 6637	94	18	10	649.22	1	0
5925 00 838 2648	94	12	50	70.87	10	0
5925 00 839 3889	94	0	23	174.78	3	0
5925 00 848 7917	95	130	100	495.65	230	3
5925 00 849 2763	94	144	1127	353.11	578	48
5925 00 849 2765	94	12	20	162.5	9	0
5925 00 849 2766	94	4	5	651.89	0	0
5925 00 849 2767	94	3	23	60.95	0	0
5925 00 850 8145	94	70	5	70.87	9	0
5925 00 850 8146	94	80	35	193.6	8	4
5925 00 853 1995	94	40	15	221.97	0	4
5925 00 877 8066	94	15	89	60.95	33	16
5925 00 879 0971	94	0	337	110.4	438	165
5925 00 879 5108	94	45	40	569.22	6	4
5925 00 883 7656	94	34	40	60.38	12	0
5925 00 883 7657	94	11	55	193.6	7	0
5925 00 883 7660	94	22	5	60.95	16	2
5925 00 883 7670	94	23	28	60.95	7	3
5925 00 883 7673	94	8	5	70.87	0	0
5925 00 892 9932	94	14	30	379.86	17	0
5925 00 897 0644	94	62	195	169.62	51	11
5925 00 900 5934	94	0	100	20.41	77	0
5925 00 903 1640	94	5	5	225.18	0	0
5925 00 916 0367	94	6	20	177.55	1	0
5925 00 920 6437	94	7	20	230.31	32	7
5925 00 923 4152	94	0	8	604.25	8	0
5925 00 925 7840	94	5	30	559.58	3	0
5925 00 929 7272	94	1	5	225.18	3	2
5925 00 931 0315	94	6	20	403.2	2	3
5925 00 934 2842	94	1	15	689.56	18	2
5925 00 940 3003	94	68	85	202.82	39	10
5925 00 945 3426	94	13	5	651.89	0	0

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
14	0.5	9	5	7	5	2	2150.2	1075.1
29	0.5	15	14	9	13	7	4664.75	2332.375
132	0.5	545	-413	395	300	-563	81306	40653
5	0.5	17	-12	8	17	-20	1087.35	543.675
1	0.5	141	-140	125	31	-155	13610.32	6805.16
24	0.5	12	12	11	3	10	2322.15	1161.075
226	0.5	113	113	91	45	90	17261.1	8630.55
17	0.5	22	-5	17	10	-10	4189	2094.5
5	0.5	3	2	1	3	1	3259.45	1629.725
79	0.5	47	32	33	28	18	31014.5	15507.25
15	0.5	8	7	5	5	5	2225	1112.5
27	0.5	14	13	12	5	10	6492.2	3246.1
52	0.5	31	21	19	25	8	3543.5	1771.75
36	0.5	12	24	6	12	18	4019.94	2009.97
3	0.4	138	-135	108	50	-155	49565	24782.5
741	0.5	636	105	354	564	-177	397955	198977.5
23	0.5	16	7	11	10	2	3250	1625
9	0.5	5	4	3	3	3	3259.45	1629.725
26	0.5	13	13	7	12	7	1401.85	700.925
66	0.5	38	28	36	3	27	354.35	177.175
111	0.5	58	53	49	18	44	6776	3388
59	0.5	28	31	24	8	27	3329.55	1664.775
87	0.5	52	35	30	45	12	5424.55	2712.275
64	0.5	169	-105	84	169	-189	37204.8	18602.4
83	0.5	43	40	33	20	30	22768.8	11384.4
62	0.5	37	25	27	20	15	2415.2	1207.6
59	0.5	33	26	19	28	12	10648	5324
13	0.5	14	-1	12	3	-2	304.75	152.375
47	0.5	26	21	19	14	14	1706.6	853.3
13	0.5	7	6	5	3	5	354.35	177.175
27	0.5	22	5	15	15	-3	11395.8	5697.9
217	0.5	129	88	80	98	39	33075.9	16537.95
23	0.5	50	-27	25	50	-52	2041	1020.5
10	0.5	5	5	4	3	3	1125.9	562.95
25	0.5	13	12	8	10	7	3551	1775.5
2	0.5	14	-12	9	10	-17	4606.2	2303.1
0	0.5	4	-4	2	4	-6	4834	2417
32	0.5	18	14	10	15	7	16787.4	8393.7
5	0.5	3	2	2	3	0	1125.9	562.95
27	0.5	13	14	8	10	9	8064	4032
0	0.5	8	-8	4	8	-12	10343.4	5171.7
124	0.5	77	47	55	43	26	17239.7	8619.85
18	0.5	9	9	8	3	7	3259.45	1629.725

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5925 00 946 7775	94	32	45	187.14	36	7
5925 00 950 2467	94	6	18	177.55	5	0
5925 00 964 3981	94	75	155	499.29	42	20
5925 00 981 2150	94	18	3	112.5	10	2
5925 00 985 0908	94	9	30	606.14	0	3
5925 00 990 2739	94	0	8	167.5	0	0
5925 01 004 2475	94	9	15	226.25	2	0
5925 01 023 5398	94	6	5	225.18	0	0
5925 01 032 1122	94	225	18	138.63	253	27
5925 01 093 4379	95	23	2	207.46	16	1
5925 01 130 5343	94	0	45	180.94	59	17
5925 01 159 7595	94	43	100	169.75	74	3
5935 00 014 6472	95	21	189	51.65	71	1
5935 00 054 6559	95	574	371	27.8	439	78
5935 00 055 7939	95	43	117	23.82	7	0
5935 00 056 9694	95	0	3	8.53	2	0
5935 00 057 0308	95	8	257	82.25	0	4
5935 00 057 5830	95	45	50	156.78	28	20
5935 00 062 1142	95	39	79	35.95	23	1
5935 00 065 9803	97	0	29	14.84	9	17
5935 00 067 4688	92	217	392	140.41	187	46
5935 00 067 4695	92	63	296	152.51	73	40
5935 00 069 5500	95	10	108	31.57	13	3
5935 00 069 5502	95	20	100	23.79	26	0
5935 00 069 5510	95	14	153	24.84	17	5
5935 00 078 9337	95	19	222	96.27	26	1
5935 00 080 7586	95	0	156	9.44	189	33
5935 00 081 7211	92	145	100	112.01	181	12
5935 00 083 5050	92	243	813	59.1	474	121
5935 00 087 8550	95	0	73	18.57	4	0
5935 00 087 8552	95	35	121	18.16	16	0
5935 00 088 8108	95	61	100	40.32	24	0
5935 00 088 8650	95	80	170	33.99	64	15
5935 00 089 2893	95	93	311	31.9	42	1
5935 00 089 6611	95	12	225	28.67	23	8
5935 00 089 6978	95	118	100	33.27	2	5
5935 00 089 8868	96	453	500	21.1	358	978
5935 00 103 7374	87	204	50	244.82	264	31
5935 00 106 6100	93	107	110	2.54	102	0
5935 00 119 3192	92	8	10	307.4	8	2
5935 00 119 3201	92	28	10	310.55	11	23
5935 00 138 1454	96	15	500	22.4	90	11
5935 00 160 3332	96	64	500	27.9	49	3

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
48	0.5	39	9	27	23	-2	8421.3	4210.65
19	0.5	12	7	8	9	2	3195.9	1597.95
208	0.5	115	93	76	78	54	77389.95	38694.97
13	0.5	11	2	10	2	1	337.5	168.75
42	0.5	20	22	12	15	15	18184.2	9092.1
8	0.5	4	4	2	4	2	1340	670
22	0.5	12	10	8	8	6	3393.75	1696.875
11	0.5	6	5	4	3	4	1125.9	562.95
17	0.5	122	-105	117	9	-109	2495.34	1247.67
10	0.4	15	-5	14	1	-5	414.92	207.46
3	0.5	23	-20	11	23	-31	8142.3	4071.15
72	0.5	72	0	47	50	-25	16975	8487.5
140	0.4	126	14	70	94	-24	9761.85	4880.925
584	0.4	567	17	455	186	-57	10313.8	5156.9
153	0.4	96	57	61	59	33	2786.94	1393.47
1	0.6	2	-1	1	2	-2	25.59	12.795
269	0.4	159	110	82	129	58	21138.25	10569.13
87	0.4	57	30	42	25	20	7839	3919.5
96	0.4	71	25	47	40	9	2840.05	1420.025
37	0.2	23	14	11	15	11	430.36	215.18
468	0.7	183	285	124	196	148	55040.72	27520.36
326	0.7	108	218	63	148	115	45142.96	22571.48
108	0.4	71	37	38	54	16	3409.56	1704.78
94	0.4	72	22	42	50	2	2379	1189.5
155	0.4	100	55	54	77	24	3800.52	1900.26
216	0.4	145	71	78	111	27	21371.94	10685.97
0	0.4	94	-94	47	78	-125	1472.64	736.32
76	0.7	4	72	59	50	-33	11201	5600.5
703	0.7	317	386	195	407	101	48048.3	24024.15
69	0.4	44	25	22	37	10	1355.61	677.805
140	0.4	94	46	57	61	22	2197.36	1098.68
137	0.4	97	40	67	50	20	4032	2016
201	0.4	150	51	99	85	17	5778.3	2889.15
363	0.4	242	121	149	156	58	9920.9	4960.45
222	0.4	142	80	74	113	35	6450.75	3225.375
221	0.4	131	90	101	50	70	3327	1663.5
1573	0.3	667	906	492	250	831	10550	5275
21	1	0	21	0	25	-4	12241	6120.5
115	0.6	87	28	65	55	-5	279.4	139.7
12	0.7	5	7	4	5	3	3074	1537
50	0.7	11	39	10	5	35	3105.5	1552.75
436	0.3	361	75	186	250	0	11200	5600
518	0.3	395	123	220	250	48	13950	6975

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 163 3334	96	146	500	62.1	38	8
5935 00 173 7277	87	716	275	71.49	955	37
5935 00 184 7368	92	29	111	183.57	74	42
5935 00 189 6245	93	1427	10838	1.43	3734	1096
5935 00 227 7094	92	82	250	160.87	80	16
5935 00 235 8525	87	275	25	160.96	323	35
5935 00 250 0905	87	30	118	113.5	166	136
5935 00 259 3318	93	430	1921	1.99	1747	115
5935 00 259 6044	87	97	200	15.78	268	76
5935 00 274 1986	96	0	172	42.05	2	5
5935 00 328 3755	95	25	500	9.31	129	40
5935 00 333 7508	96	14	100	333.22	27	0
5935 00 365 9400	95	7	100	118.88	15	0
5935 00 396 6852	95	45	244	15.89	24	0
5935 00 412 1219	93	5	50	2.18	22	0
5935 00 439 0551	92	30	96	170	13	6
5935 00 450 5139	96	0	485	20.1	35	2
5935 00 455 4678	92	29	55	206.77	23	19
5935 00 455 9595	95	2	100	22.15	0	0
5935 00 472 0288	92	3	50	15.04	36	0
5935 00 476 6315	92	76	775	2.08	111	0
5935 00 487 5789	96	69	174	210	154	11
5935 00 497 5688	95	40	500	12.77	93	6
5935 00 497 9198	92	196	617	9.53	175	209
5935 00 497 9200	92	108	1000	3.31	300	7
5935 00 497 9202	92	479	1436	2.12	253	39
5935 00 497 9203	92	1628	6411	2.17	4033	242
5935 00 497 9204	92	324	1093	1.92	272	5
5935 00 498 5639	92	148	1849	8.86	168	35
5935 00 498 5641	92	156	344	5.48	285	0
5935 00 498 5642	92	196	365	3.03	424	124
5935 00 501 0948	96	30	500	15.53	24	5
5935 00 503 9885	96	31	500	22.35	15	0
5935 00 520 5235	93	12	10	6.45	1	0
5935 00 523 9462	87	313	250	67.31	416	1
5935 00 557 2514	89	9	613	147.54	20	5
5935 00 578 9329	93	863	10	37.49	335	78
5935 00 603 7706	93	35	110	23.1	39	2
5935 00 603 7707	93	138	262	10.93	157	9
5935 00 605 6714	96	10	500	18.28	4	0
5935 00 615 3637	95	17	100	22.62	17	9
5935 00 628 6513	96	27	103	95.1	39	3
5935 00 631 4156	97	17	98	1021.57	56	14

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
616	0.3	452	164	277	250	89	31050	15525
73	1	0	73	0	138	-65	19659.75	9829.875
108	0.7	42	66	25	56	27	20376.27	10188.14
9627	0.6	4906	4721	2738	5419	1470	15498.34	7749.17
268	0.7	100	168	62	125	81	40217.5	20108.75
12	1	0	12	0	13	-1	4024	2012
118	1	0	118	0	59	59	13393	6696.5
719	0.6	940	-221	556	961	-798	3822.79	1911.395
105	1	0	105	0	100	5	3156	1578
175	0.3	120	55	60	86	29	7232.6	3616.3
436	0.4	315	121	165	250	21	4655	2327.5
87	0.3	80	7	45	50	-8	33322	16661
92	0.4	64	28	34	50	8	11888	5944
265	0.4	173	92	100	122	43	3877.16	1938.58
33	0.6	22	11	12	25	-4	109	54.5
119	0.7	38	81	23	48	48	16320	8160
452	0.3	340	112	169	243	40	9748.5	4874.25
80	0.7	25	55	17	28	35	11372.35	5686.175
102	0.4	61	41	31	50	21	2215	1107.5
17	0.7	16	1	8	25	-16	752	376
740	0.7	255	485	139	388	213	1612	806
100	0.3	170	-70	109	87	-96	36540	18270
453	0.4	324	129	174	250	29	6385	3192.5
847	0.7	244	603	151	309	387	5880.01	2940.005
815	0.7	332	483	182	500	133	3310	1655
1701	0.7	575	1126	359	718	624	3044.32	1522.16
4248	0.7	2412	1836	1450	3206	-408	13911.87	6955.935
1150	0.7	425	725	261	547	342	2098.56	1049.28
1864	0.7	599	1265	322	925	617	16382.14	8191.07
215	0.7	150	65	98	172	-55	1885.12	942.56
261	0.7	168	93	113	183	-35	1105.95	552.975
511	0.3	371	140	196	250	65	7765	3882.5
516	0.3	372	144	197	250	69	11175	5587.5
21	0.6	9	12	7	5	9	64.5	32.25
148	1	0	148	0	125	23	16827.5	8413.75
607	1	0	607	0	307	300	90442.02	45221.01
616	0.6	349	267	347	5	264	374.9	187.45
108	0.6	58	50	36	55	17	2541	1270.5
252	0.6	160	92	108	131	13	2863.66	1431.83
506	0.3	357	149	182	250	74	9140	4570
109	0.4	70	39	40	50	19	2262	1131
94	0.3	91	3	55	52	-13	9795.3	4897.65
73	0.2	92	-19	53	49	-29	100113.9	50056.93

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 660 5590	93	630	4110	2.34	1998	490
5935 00 660 5846	92	1547	2809	68.36	2542	378
5935 00 660 5854	93	0	15	5.05	12	2
5935 00 660 5855	92	722	1402	81.11	1245	281
5935 00 670 0033	95	231	1104	35.07	334	29
5935 00 679 0479	93	0	63	1.72	6	0
5935 00 683 1402	93	227	210	5.25	389	30
5935 00 683 2312	92	11	9	158.77	19	13
5935 00 683 5102	95	0	100	26.5	56	0
5935 00 687 1122	95	138	357	90.02	274	11
5935 00 689 4662	92	1	50	215.05	26	25
5935 00 704 6020	87	41	35	277.47	16	0
5935 00 705 9887	95	1	100	34.84	19	0
5935 00 726 4204	92	51	240	181.97	288	45
5935 00 730 4145	95	7	113	18.04	9	0
5935 00 755 6213	95	182	316	42.28	288	8
5935 00 761 3235	95	0	100	74.13	97	2
5935 00 761 4344	92	35	50	317.68	12	0
5935 00 767 5154	95	59	100	32.97	21	19
5935 00 769 5490	95	20	100	80.06	1	1
5935 00 781 3036	95	0	100	18.88	5	0
5935 00 787 3534	95	47	156	17.33	36	8
5935 00 791 5476	95	3	100	119.81	1	0
5935 00 799 3054	95	74	500	12.17	153	2
5935 00 804 2942	95	16	100	57.06	1	0
5935 00 804 2957	95	31	100	48.84	0	52
5935 00 805 3463	95	64	158	59.47	41	9
5935 00 805 3946	95	20	188	167.43	25	5
5935 00 805 4664	95	93	328	50.08	142	18
5935 00 806 7509	92	698	1400	78.81	1343	263
5935 00 807 9629	95	171	511	89.55	187	42
5935 00 811 8635	92	315	786	98.9	585	236
5935 00 812 2554	87	66	100	92.44	134	28
5935 00 813 0030	95	45	500	9.8	38	3
5935 00 814 5798	95	169	100	43.82	115	7
5935 00 814 5814	95	74	100	47.48	16	36
5935 00 814 5815	95	78	113	40.46	16	12
5935 00 820 9501	92	76	1100	55.02	346	56
5935 00 823 0295	95	192	323	32.47	144	30
5935 00 827 5022	96	0	500	18.96	613	127
5935 00 836 9653	95	14	100	34.72	0	0
5935 00 838 2762	87	338	57	196.56	273	122
5935 00 842 1374	95	7	100	28.1	1	0
5935 00 842 1376	95	72	100	72.56	3	2

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
3232	0.6	1896	1336	1074	2055	103	9617.4	4808.7
2192	0.7	1307	885	885	1405	-98	192023.2	96011.62
5	0.6	6	-1	3	8	-6	75.75	37.875
1160	0.7	637	523	427	701	32	113716.2	56858.11
1030	0.4	801	229	470	552	8	38717.28	19358.64
57	0.6	25	32	12	32	13	108.36	54.18
78	0.6	175	-97	133	105	-160	1102.5	551.25
14	0.7	6	8	5	5	4	1428.93	714.465
44	0.4	60	-16	30	50	-36	2650	1325
232	0.4	297	-65	190	179	-137	32137.14	16068.57
50	0.7	15	35	8	25	17	10752.5	5376.25
60	1	0	60	0	18	42	9711.45	4855.725
82	0.4	61	21	31	50	1	3484	1742
48	0.7	87	-39	51	120	-123	43672.8	21836.4
111	0.4	72	39	38	57	16	2038.52	1019.26
218	0.4	299	-81	204	158	-144	13360.48	6680.24
5	0.4	60	-55	30	50	-75	7413	3706.5
73	0.7	26	47	18	25	30	15884	7942
157	0.4	94	63	65	50	42	3297	1648.5
120	0.4	72	48	42	50	28	8006	4003
95	0.4	60	35	30	50	15	1888	944
175	0.4	122	53	75	78	22	2703.48	1351.74
102	0.4	62	40	32	50	20	11981	5990.5
423	0.4	344	79	194	250	-21	6085	3042.5
115	0.4	70	45	40	50	25	5706	2853
183	0.4	79	104	49	50	84	4884	2442
190	0.4	133	57	86	79	25	9396.26	4698.13
188	0.4	125	63	68	94	26	31476.84	15738.42
297	0.4	253	44	154	164	-21	16426.24	8213.12
1018	0.7	629	389	419	700	-101	110334	55167
537	0.4	409	128	256	256	25	45760.05	22880.02
752	0.7	330	422	212	393	147	77735.4	38867.7
60	1	0	60	0	50	10	9244	4622
510	0.4	327	183	177	250	83	4900	2450
161	0.4	161	0	131	50	-20	4382	2191
194	0.4	104	90	74	50	70	4748	2374
187	0.4	115	72	80	57	50	4571.98	2285.99
886	0.7	353	533	188	550	148	60522	30261
401	0.4	309	92	212	162	27	10487.81	5243.905
14	0.3	350	-336	175	250	-411	9480	4740
114	0.4	68	46	38	50	26	3472	1736
244	1	0	244	0	29	215	11203.92	5601.96
106	0.4	64	42	34	50	22	2810	1405
171	0.4	103	68	73	50	48	7256	3628

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 842 9045	87	409	176	139.63	411	156
5935 00 843 0144	87	25	25	424.61	24	3
5935 00 845 7508	95	120	300	32.34	35	0
5935 00 856 2872	95	2	100	40.86	4	11
5935 00 872 4730	97	13	240	88.47	34	5
5935 00 872 6853	87	47	25	76.52	41	3
5935 00 878 1603	96	0	500	11.9	280	0
5935 00 878 1604	96	0	100	44.76	36	75
5935 00 879 8440	92	80	410	254	215	28
5935 00 883 5868	92	15	30	143.12	10	1
5935 00 884 3427	96	34	2500	35.85	235	4
5935 00 886 9796	87	13	25	142.04	11	5
5935 00 888 3708	96	296	500	9.48	319	31
5935 00 897 4610	95	10	100	28.09	2	2
5935 00 900 0859	95	0	100	36.99	3	0
5935 00 900 1239	96	14	500	8.15	10	0
5935 00 900 1987	95	95	203	26.27	24	6
5935 00 900 1989	95	11	100	38.08	5	1
5935 00 900 1990	95	8	100	38.46	12	2
5935 00 900 1992	95	2	100	53.68	0	3
5935 00 900 1997	95	52	100	18.95	10	10
5935 00 900 2001	95	28	164	31.88	14	10
5935 00 900 2002	95	29	100	55.66	18	3
5935 00 900 2003	95	4	100	38.16	0	1
5935 00 900 2076	95	27	100	19.92	0	0
5935 00 901 5912	95	20	100	23.49	0	4
5935 00 905 6652	95	60	182	25.41	16	34
5935 00 905 9676	92	257	850	72.05	553	131
5935 00 910 9280	92	8	25	245.91	3	3
5935 00 911 9871	93	414	37	2.98	331	0
5935 00 912 1432	93	83	31	4.56	84	0
5935 00 912 1436	93	414	1010	1.39	306	0
5935 00 912 1498	93	219	515	1.81	176	0
5935 00 912 6393	95	43	100	40.57	67	10
5935 00 912 7813	95	25	100	26.71	38	5
5935 00 913 7613	92	9	25	324.74	10	6
5935 00 916 0413	95	115	251	27.4	100	18
5935 00 916 0514	92	29	16	298.99	36	20
5935 00 916 0641	92	40	10	396.23	0	7
5935 00 917 3325	95	4	100	59.15	0	4
5935 00 919 0562	96	206	500	31.6	174	14
5935 00 923 4874	92	7	25	284.49	29	8
5935 00 937 7371	93	8	50	6.17	5	0

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
330	1	0	330	0	88	242	24574.88	12287.44
29	1	0	29	0	13	16	10615.25	5307.625
385	0.4	252	133	162	150	73	9702	4851
109	0.4	61	48	31	50	28	4086	2043
224	0.2	202	22	106	120	-2	21232.8	10616.4
34	1	0	34	0	13	21	1913	956.5
220	0.3	350	-130	175	250	-205	5950	2975
139	0.3	70	69	35	50	54	4476	2238
303	0.7	147	156	86	205	12	104140	52070
36	0.7	14	22	9	15	12	4293.6	2146.8
2303	0.3	1774	529	899	1250	154	89625	44812.5
32	1	0	32	0	13	19	3551	1775.5
508	0.3	557	-49	382	250	-124	4740	2370
110	0.4	66	44	36	50	24	2809	1404.5
97	0.4	60	37	30	50	17	3699	1849.5
504	0.3	360	144	185	250	69	4075	2037.5
280	0.4	179	101	118	102	60	5332.81	2666.405
107	0.4	67	40	37	50	20	3808	1904
98	0.4	65	33	35	50	13	3846	1923
105	0.4	61	44	31	50	24	5368	2684
152	0.4	91	61	61	50	41	1895	947.5
188	0.4	115	73	66	82	40	5228.32	2614.16
114	0.4	77	37	47	50	17	5566	2783
105	0.4	62	43	32	50	23	3816	1908
127	0.4	76	51	46	50	31	1992	996
124	0.4	72	52	42	50	32	2349	1174.5
260	0.4	145	115	91	91	78	4624.62	2312.31
685	0.7	332	353	205	425	55	61242.5	30621.25
33	0.7	10	23	6	13	14	6147.75	3073.875
120	0.6	180	-60	173	19	-72	110.26	55.13
30	0.6	46	-16	39	16	-25	141.36	70.68
1118	0.6	570	548	368	505	245	1403.9	701.95
558	0.6	294	264	190	258	110	932.15	466.075
86	0.4	86	0	56	50	-20	4057	2028.5
92	0.4	75	17	45	50	-3	2671	1335.5
30	0.7	10	20	6	13	11	8118.5	4059.25
284	0.4	220	64	144	126	14	6877.4	3438.7
29	0.7	14	15	11	8	10	4783.84	2391.92
57	0.7	15	42	14	5	38	3962.3	1981.15
108	0.4	62	46	32	50	26	5915	2957.5
546	0.3	494	52	319	250	-23	15800	7900
11	0.7	10	1	6	13	-8	7112.25	3556.125
53	0.6	23	30	13	25	15	308.5	154.25

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 938 7299	95	11	100	27.56	8	0
5935 00 946 1272	96	28	500	7.6	42	3
5935 00 947 2925	95	48	500	18.5	487	115
5935 00 951 2154	87	158	100	230.5	176	26
5935 00 952 2204	95	152	100	37.51	30	13
5935 00 954 3147	96	19	500	13	5	7
5935 00 954 7895	95	23	100	19.65	7	10
5935 00 954 7896	95	5	100	29.84	9	0
5935 00 954 9050	95	37	196	21.81	154	44
5935 00 954 9064	95	18	100	22.14	3	5
5935 00 954 9072	95	53	254	28.44	87	11
5935 00 954 9076	95	45	100	25.16	26	7
5935 00 956 4983	92	20	40	176.44	1	11
5935 00 956 8340	99	28	144	95.54	30	22
5935 00 956 8341	99	63	113	81.6	63	15
5935 00 957 8473	95	109	100	20.75	45	10
5935 00 957 8480	95	72	100	31.64	14	9
5935 00 958 7507	95	182	622	43.39	120	61
5935 00 959 8561	95	36	100	56.12	22	8
5935 00 962 0221	96	26	500	15.9	2	3
5935 00 967 1272	92	224	350	194.34	34	82
5935 00 967 1273	88	751	800	154.27	473	39
5935 00 967 1279	87	481	108	181.58	78	14
5935 00 967 1288	92	52	1325	18.03	123	30
5935 00 967 1291	92	85	500	174.38	80	22
5935 00 967 1295	92	166	550	186.19	123	48
5935 00 967 1308	92	84	250	309.85	165	26
5935 00 967 1310	92	54	400	349.77	84	7
5935 00 967 1311	87	41	375	346.86	88	0
5935 00 968 6929	87	212	145	3.01	182	54
5935 00 972 3151	92	315	2000	76.27	1169	201
5935 00 974 5683	92	1039	350	5.76	101	0
5935 00 974 5684	92	99	1625	136.52	380	47
5935 00 974 5685	92	871	1425	149.55	494	33
5935 00 974 6929	95	23	100	13.05	8	0
5935 00 976 0023	92	546	1700	148.57	443	45
5935 00 976 4811	95	38	121	26.93	10	12
5935 00 977 5821	92	11	30	223.28	2	2
5935 00 983 5978	95	5	311	17.44	3	2
5935 00 983 8873	87	25	50	183.93	40	10
5935 00 988 5945	95	99	235	23.95	49	17
5935 00 989 0900	95	12	100	41.03	110	9
5935 00 989 5998	92	128	675	94.27	398	106

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
103	0.4	67	36	37	50	16	2756	1378
489	0.3	370	119	195	250	44	3800	1900
176	0.4	329	-153	179	250	-253	9250	4625
108	1	0	108	0	50	58	23050	11525
235	0.4	151	84	121	50	64	3751	1875.5
521	0.3	363	158	188	250	83	6500	3250
126	0.4	74	52	44	50	32	1965	982.5
96	0.4	63	33	33	50	13	2984	1492
123	0.4	140	-17	81	98	-56	4274.76	2137.38
120	0.4	71	49	41	50	29	2214	1107
231	0.4	184	47	108	127	-4	7223.76	3611.88
126	0.4	87	39	57	50	19	2516	1258
70	0.7	18	52	12	20	38	7057.6	3528.8
164	0.3	120	44	70	72	22	13757.76	6878.88
128	0.3	123	5	83	57	-12	9220.8	4610.4
174	0.4	125	49	95	50	29	2075	1037.5
167	0.4	103	64	73	50	44	3164	1582
745	0.4	482	263	296	311	138	26988.58	13494.29
122	0.4	82	40	52	50	20	5612	2806
527	0.4	316	211	166	250	111	7950	3975
622	0.7	172	450	120	175	327	68019	34009.5
1117	1	0	1117	0	400	717	123416	61708
525	1	0	525	0	54	471	19610.64	9805.32
1284	0.7	413	871	214	663	407	23889.75	11944.88
527	0.7	176	351	101	250	176	87190	43595
641	0.7	215	426	132	275	234	102404.5	51202.25
195	0.7	100	95	63	125	7	77462.5	38731.25
377	0.7	136	241	76	200	101	139908	69954
328	1	0	328	0	188	140	130072.5	65036.25
229	1	0	229	0	73	156	436.45	218.225
1347	0.7	695	652	395	1000	-48	152540	76270
378	0.7	417	-39	364	175	-161	2016	1008
1391	0.7	517	874	273	813	305	221845	110922.5
1835	0.7	689	1146	475	713	647	213108.8	106554.4
115	0.4	74	41	44	50	21	1305	652.5
1848	0.7	674	1174	419	850	579	252569	126284.5
161	0.4	95	66	59	61	41	3258.53	1629.265
41	0.7	12	29	8	15	18	6698.4	3349.2
315	0.4	190	125	96	156	63	5423.84	2711.92
45	1	0	45	0	25	20	9196.5	4598.25
302	0.4	200	102	130	118	54	5628.25	2814.125
11	0.4	67	-56	37	50	-76	4103	2051.5
511	0.7	241	270	140	338	33	63632.25	31816.13

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5935 00 999 7223	92	107	235	140.94	82	34
5935 01 006 8183	96	6	500	17.8	7	0
5935 01 006 8212	96	382	500	12.35	239	0
5935 01 008 2898	90	1299	3899	0.14	4392	386
5935 01 011 7666	96	7	500	13.48	3	0
5935 01 016 3813	96	69	500	21.55	5	10
5935 01 017 3697	87	285	100	135.22	497	127
5935 01 025 9086	96	367	1070	26.12	109	9
5935 01 029 2518	95	4	100	14.28	12	0
5935 01 030 6991	95	4	100	14.74	0	0
5935 01 037 6493	96	51	500	6.9	26	0
5935 01 038 6473	95	7	100	18.44	4	0
5935 01 044 4436	90	910	730	1.09	1189	0
5935 01 044 8588	90	172	506	0.55	132	0
5935 01 045 2926	90	400	876	0.26	429	0
5935 01 045 4830	90	172	323	0.39	136	0
5935 01 064 4721	95	114	100	20.91	21	0
5935 01 065 8357	95	3	100	25.94	0	0
5935 01 072 3866	90	157	929	0.21	1086	0
5935 01 074 8607	96	39	500	8.7	49	1
5935 01 077 7173	96	5	500	22.13	5	0
5935 01 079 7333	95	16	100	35.2	3	0
5935 01 079 7383	95	2	100	59.55	7	0
5935 01 079 8948	96	229	500	11.08	287	39
5935 01 081 3860	96	23	500	7.37	33	0
5935 01 082 8806	96	19	500	7.37	37	0
5935 01 084 5790	96	12	500	4.02	5	0
5935 01 086 6228	96	13	500	7.4	1	0
5935 01 086 8444	96	27	500	9.48	30	0
5935 01 089 1419	96	16	500	6.9	12	0
5935 01 089 1420	96	49	500	16.93	48	4
5935 01 091 1846	95	0	100	34.88	100	118
5935 01 094 3684	95	3	100	82.21	6	0
5935 01 103 4797	95	0	100	16.45	0	0
5935 01 105 7922	96	29	500	11.65	0	0
5935 01 112 5449	95	5	100	17.57	0	0
5935 01 122 7526	96	21	500	20.55	139	2
5935 01 134 1247	95	6	100	119.81	1	0
5935 01 136 1973	96	6	500	14.63	0	0
5935 01 147 9432	95	4	100	87.75	3	0
5935 01 157 9555	95	48	100	120.7	22	1
5950 00 052 4343	94	1093	106	18.77	1229	54
5950 00 234 0545	97	4	176	4.85	0	0
5950 00 443 9516	97	6	35	24.25	4	6

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
294	0.7	103	191	67	118	109	33120.9	16560.45
499	0.3	354	145	179	250	70	8900	4450
643	0.3	617	26	442	250	-49	6175	3087.5
1192	0.9	520	672	325	1950	-1083	545.86	272.93
504	0.3	355	149	180	250	74	6740	3370
574	0.3	398	176	223	250	101	10775	5387.5
15	1	0	15	0	50	-35	13522	6761
1337	0.3	1006	331	631	535	171	27948.4	13974.2
92	0.4	62	30	32	50	10	1428	714
104	0.4	62	42	32	50	22	1474	737
525	0.3	386	139	211	250	64	3450	1725
103	0.4	64	39	34	50	19	1844	922
451	0.9	164	287	128	365	-42	795.7	397.85
546	0.9	68	478	43	253	250	278.3	139.15
847	0.9	128	719	84	438	325	227.76	113.88
359	0.9	50	309	33	162	164	125.97	62.985
193	0.4	128	65	98	50	45	2091	1045.5
103	0.4	62	41	32	50	21	2594	1297
0	0.9	109	-109	62	465	-527	195.09	97.545
491	0.3	377	114	202	250	39	4350	2175
500	0.3	354	146	179	250	71	11065	5532.5
113	0.4	70	43	40	50	23	3520	1760
95	0.4	61	34	31	50	14	5955	2977.5
481	0.3	510	-29	335	250	-104	5540	2770
490	0.3	366	124	191	250	49	3685	1842.5
482	0.3	363	119	188	250	44	3685	1842.5
507	0.3	358	149	183	250	74	2010	1005
512	0.3	359	153	184	250	78	3700	1850
497	0.3	369	128	194	250	53	4740	2370
504	0.3	361	143	186	250	68	3450	1725
505	0.3	384	121	209	250	46	8465	4232.5
118	0.4	60	58	30	50	38	3488	1744
97	0.4	62	35	32	50	15	8221	4110.5
100	0.4	60	40	30	50	20	1645	822.5
529	0.3	370	159	195	250	84	5825	2912.5
105	0.4	63	42	33	50	22	1757	878.5
384	0.3	365	19	190	250	-56	10275	5137.5
105	0.4	64	41	34	50	21	11981	5990.5
506	0.3	354	152	179	250	77	7315	3657.5
101	0.4	62	39	32	50	19	8775	4387.5
127	0.4	89	38	59	50	18	12070	6035
24	0.5	600	-576	573	53	-602	1989.62	994.81
180	0.2	144	36	74	88	18	853.6	426.8
43	0.2	33	10	18	18	7	848.75	424.375

NSN	LOT Yr	Beg O/H	LOT Qty	Cont U/P	Dem Qty	Cred Ret
5950 00 462 1773	94	5	44	495.56	5	4
5950 00 624 1989	95	849	7312	9.71	1297	388
5950 00 624 1990	95	3622	16417	7.87	6447	699
5950 00 780 7417	95	6	53	223.6	0	1
5950 00 983 7611	95	8	65	247.52	9	0

Dec 89 Bal	S/L Fac	Dec89 Exp O/H	Sht Lng	Exp Dec89 .5 Bal	Red LOT Qty	0.5 Sht Lng	.5 Red LOT Value	50% LB Extend Value
48	0.3	34	14	19	22	7	21804.64	10902.32
7252	0.4	4897	2355	2703	3656	893	70999.52	35499.76
14291	0.4	12023	2268	7098	8209	-1016	129201.8	64600.9
60	0.4	35	25	19	27	14	11850.8	5925.4
64	0.4	44	20	24	33	7	16088.8	8044.4

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Bibliography

1. Armstrong, Jon S. Long-Range Forecasting: From Crystal Ball to Computer. New York, John Wiley & Sons 1981.

2. Brooks, Capt Michael E. An Investigation of Time Series Growth Curves as a Predictor of Diminishing Manufacturing Sources of Electronic Components. MS Thesis LSSR 98-81. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1981 (AD-A111375).

3. Capotosti, Capt David and Capt Eugene M. Curran. A Study of the Effects of Diminishing Manufacturing Sources on the Supportability of the AN/ASQ-38 Radar System. MS Thesis LSSR 24-81. School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH, June 1981 (AD-A105185).

4. Corbett, Major James D. and others. The Relationship Between the Dollar Volume of Sales and Diminishing Manufacturing Sources for Selected Electronic Components: A Comparative Analysis. MS Thesis LSSR 17-78A. Graduate Education Division, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, June 1980 (AD-A061339).

5. Correll, John T. "The Peace to End All Wars," Air Force Magazine, 6, January 1990.

6. Davies, John. "Aging Air Cargo Fleet Flying Toward Empty on Replacement Parts," Dayton Daily News, 2-F (8 October 1989).

7. Defense Electronic Supply Center. The DESC Diminishing Manufacturing Sources and Material Shortages Study Group: Study of the Influences of Technological Change and Diminishing Manufacture Sources on DOD Electronic Parts Support. Defense Electronic Supply Center, Dayton OH, 5 December 1979.

8. -----. Diminishing Manufacturing Sources and Material Shortages (DMDMS) Program. DESC Standard Operating Procedure. Dayton OH, 11 April 1986.

9. Dimitroff, Gail. "TQM Provides the Best Defense," Electronic Engineering Times, 58, 27 November 1989.

10. Directorate of Supply Operations, DMS Group Memorandum for Record on DMS Initiatives for Reduction of Stock Fund Expenditures. Defense Electronics Supply Center, Dayton OH, 5 April 1990.

11. Fisher, Christine E. and Walter F. Sheehan. The Life-of-Type Inventory Decision for Diminishing Manufacturing Sources Items: A Sensitivity Study. MS Thesis LSSR 78-82. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1982 (AD-A122893).

12. Fluke, John. "DOD: Buy the Commercial Way," Electronic Engineering Times, 68-69, 27 November 1989.

13. Fox, Charles. "FPGA's Move Into the Military Spotlight," Electronic Engineering Times. 54, 27 November 1989.

14. Fullerton, Dave. "CALS- Acquisition by Computer," Electronic Engineering Times, 62-64, 27 November 1989.

15. Gardner, Everett S. Jr., and David G. Dannenbring, "User Optimal Policy Surfaces to Analyze Aggregate Inventory Tradeoffs", Management Science, Vol. 25, No. 8, 709-719, August 1979.

16. Ginovsky, John. "New AF Cuts, Command Overhauls Outlined," Air Force Times, 24: 3, 22 January 1990.

17. Levine, Arnold S. "DLA Beefs-up Demand Forecasting," Federal Computer Week, 7 (November 1989).

18. Makridakis, S. and others. Forecasting: Methods and Applications (Second Edition). New York: John Wiley and Sons, 1983.

19. Jackson, Tom. Inventory Management Specialist, Inventory Management Division B, Supply Branch B, Section 3. Personal Interview. Defense Electronics Supply Center, Dayton OH, 13 October 1989.

20. Martino, Joseph P. Technological Forecasting for Decision Making. New York: American Elsevier Publishing Company, Inc., 1972.

21. Merritt, Donald E. S. "Making Spares Available for Aging Military Equipment," Defense Management Journal, Vol 22, No.1, 24-29 (First Quarter 1986).

22. Nessler, James E. Chairman DMS Central Control Staff. Personal interview. Defense Electronics Supply Center, Dayton, OH, 13 October 1989.

23. Patterson, Brigadier General George K., USAF. "The Weak Link in Defense Logistics," Logistics Spectrum, 28-32, Winter 1978.

24. Skinner, Wickham and David C. D. Rogers, Manufacturing Policy in the Electronics Industry 3d ed. Homewood IL: Richard D. Irwin, Inc., 1968.

25. "The Global Network of United States Military Bases," The Defense Monitor 17: 1-8, 30 May 1989.

26. Tirado, Joseph "QML Could Streamline Production," Electronic Engineering Times, 49, 27 November 1989.

27. Thompson, Mark "Military Spent Unsparingly on Parts" Philadelphia Inquirer, 3-4, (March 1990).

28. Tucker, Isabel L. and others. "Diminished Manufacturing Sources Life-of-Type Requirements Forecasting" presentation to Supply Operations Directorate by DECS DMS Oversigt Committee. DESC, Dayton OH (Jan 1989).

Vita

Mr. James L. Brown was born on 25 February 1949 in Union City, Indiana. He graduated from Mississinewa Valley High School in rural Darke County, Ohio in 1967. He was enrolled at Ohio Northern University at Celina, Ohio and was a student there until entering the United States Marine Corps in 1969. After serving eighteen months in the Republic of Vietnam he returned to MCB, Camp Pendleton, California where he served at 1st Marine Division Headquarters G-3. Upon his release from active duty in 1973, Mr. Brown was enrolled at Wright State University Dayton, Ohio and was subsequently awarded a Bachelor of Science Degree in Business Finance in 1979. In 1980, Mr. Brown completed one year of a Master of Business Administration program before entering government service at the Defense Electronics Supply Center in Dayton, Ohio. His most recent assignment was as an Inventory Management Supervisor in the Supply Operations Directorate. His duties included supervising an inventory management section and serving as a subject matter expert (SME) in the field of inventory management. Mr. Brown was assigned to the Air Force Institute of Technology in May 1989 to pursue a masters degree in Logistics Management.

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13. ABSTRACT (Maximum 200 words)

This thesis studied the reasons for over procurement in the case of long term support for Diminished Manufacturing Source (DMS) items of supply at the Defense Electronics Supply Center at Dayton, Ohio. A sample of 351 DMS items was selected for analysis. Fifteen percent of the items were deficient in stock primarily as a result of increased demands after the final LOT buy was made. Trend analysis reveals that 75% of DMS items experience declining demand rates both before and after the declaration of DMS. To test the effects of reducing LOT quantities, all past LOT buys were reduced by 10%, 33% and 50% and checked against past demands. New stocks were noted as a result of reductions in LOT buys. Since the forecasting of future demands is inacurate, this study recommends a common sense approach of 10% reductions to demand based LOT buys for DMS items of supply. Additionally, the increased use of a 40-quarter demand forecast is encouraged to better identify those items with increasing demands. For those items already procurred which experience increasing demands after the DMS final buy, a new effort is recommended to find new sources of supply.

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